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PSYCHOLOGY FOR TEACHERS

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BY THE SAME AUTHOR

ANIMAL BEHAVIOUR

SECOND EDITION

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PSYCHOLOGY FOR
TEACHERS

BY

C. LLOYD MORGAN LL.D., F.R.S.

PROFESSOR OF PSYCHOLOGY IN THE UNIVERSITY OF BRISTOL

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PREFACE

THE belief of those who urge that the teacher whose business it is to minister to mental development should possess some systematic knowledge of psychology, has gained ground and become more widely spread since this little book appeared some twelve years ago. Meanwhile in psychology itself there has been progress both in the organisation of its subject-matter and in methods of exposition. After more than a decade, therefore, careful revision of this book seemed necessary; a somewhat fuller treatment appeared to be called for; a rather closer analysis seemed justifiable. But when I took the matter in hand it soon became evident that to carry out my purpose I must completely rewrite rather than merely revise my book, which now goes forth as a new work written with the same desire to be helpful to my colleagues in the teaching profession.

I have to thank many correspondents for kindly criticism and friendly advice. One only has expressed dissatisfaction that I had written a Psychology for Teachers and not a manual of school practice. Lest others should take up the book under a misapprehension of the purpose with which it has been written, I must here distinctly state that my object has been to set forth some of those principles of psychology,

with especial reference to processes of mental development, which should be helpful to teachers through the light they throw on the manner of the working of the mind; and not, save incidentally, to indicate how these principles may be applied. I have desired to contribute rather to the education of the teacher than to his training. One of the points on which insistence is laid in this work is the importance of preparation. It is because I am convinced that a knowledge of psychology is of value to those who are engaged in the spread of education and the improvement of educational methods, that I have written the chapters which follow. Mine is the task of aiding in the preparation of the teacher; his is the opportunity for application to particular problems and special subjects.

On the comments of another critic I may be allowed to say a few words, since they may serve to elucidate my point of view. The child when he comes under the discipline of the teacher, even in the kindergarten, has already reached a certain level of mental development; he has gained some experience; he behaves in more or less appropriate ways under given circumstances; he already possesses a good deal of intelligence although he has but little systematic knowledge. Why not start with him as he then stands? Why trouble to inquire how this practical and serviceable experience had its origin in the early months or years of life? The teacher, as such, it may be said, has little concern with it. He may take its existence for granted. Such is the contention of my critic. I think it not improbable that others may, in some degree, share his views. They may feel some impatience with my genetic treatment of the initial stages of the dawn of child-consciousness, and the very beginnings of the mental life.

But it must be remembered that the process of development is one and continuous. It is impossible adequately to understand its later phases if the earlier stages are merely taken for granted. If once the principle of taking things for granted is admitted, we, so far, depart from the more rational principle of explaining matters. In every branch of inquiry which deals with continuity of process it has been found that the initial stages cannot be disregarded if the development as a whole is to be rendered clear. If we just accept the child as he is when he comes to school, without inquiring how he came to be what he already is, we shall not be in a position to understand how best to graft the systematic knowledge with which we are chiefly concerned on the naïve experience with which it should be in vital touch.

In any case a genetic method of treatment is deliberately part of my settled purpose in the extended and, I trust, improved work which now leaves my hands. I would urge the teacher, so far as in him lies, to take a broad and comprehensive view of mental development, and to be a close observer of the workings of his own mind and of that of each pupil under his charge. As Sir Joshua Fitch said in the Preface which he contributed to the first edition, "It is not desirable, in the present state of our knowledge, that any one psychological theory should be universally accepted, and regarded as orthodox. What is desirable, is that men and women who intend to consecrate their lives to the business of teaching, should acquire the habit of studying the nature of the phenomena with which they have to deal; and of finding out for themselves the laws which govern mental processes, and the conditions of healthy growth in the minds and bodies

of their pupils." I trust that the words which he then added may still in some measure apply. "This book," said Sir Joshua Fitch, "will help them much in such a study, and will do so all the more effectually, because it does not undertake to save the schoolmaster the trouble of thinking out rules and theories for himself. The reader who consults these pages in quest of aphorisms, definite rules of action which are applicable to all cases, or "tips" to be used in passing an examination, will not find what he seeks. But he will get something better—the stimulus and suggestion which may help to make his own observations of child-nature more exact; the material for new thought; and not a little aid and encouragement in forming, day by day, a higher ideal both of the duty he has undertaken, and of the spirit in which it is to be done."

C. LLOYD MORGAN.

BRISTOL, *August* 1906.

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PSYCHOLOGY FOR TEACHERS

CHAPTER I

STATES OF CONSCIOUSNESS

MANY definitions have been given of the aim of Education. From a broad and comprehensive point of view it may be regarded as the means by which the individual is brought into vital touch with his environment. The word "environment" is used as a technical term in natural history for all the surrounding conditions which in any way affect, or are affected by, an animal or plant. The environment of a child or man comprises, therefore, all those external circumstances which influence his active life. In it there are a number of inanimate objects, some of them natural, some of them artificially shaped or produced. With them he must be acquainted, learn their uses, and acquire skill in handling them. Unless he can manipulate them freely he is not in vital touch with this part of his environment. Then there are his companions and fellows. They react quite differently from the inanimate objects. Instead of being passive they are active, like himself. And he has to learn how they act towards him and respond to his own actions. Unless he is acquainted with their modes of give and take he is not in vital touch with this part of

his environment. Animals and plants in their several degrees stand either nearer to inanimate objects or nearer to his human fellows. The child when left to itself will get into practical touch with surrounding things and people. And this, in the broadest sense of the word, is part of his education. But the touch must grow wider, closer, and more accurate. Since he is a social being, language is a means to this end. Here the ministry of mother or nurse is helpful; and at a somewhat later stage the more specialised ministry of the teacher begins. For the teacher is a specialist, whose duty it is to adopt all accredited means of bringing the individuals committed to his charge into yet closer and more vital touch with an environment which grows wider and richer with the child's advancing years. But how and in what sense does it grow wider and richer?

It is clear that it is through experience that ability to deal with surrounding things and people is gained. Through such experience this, that, or the other situation of daily life acquires meaning, so that similar situations can be dealt with surely and promptly. To be in vital touch with the environment is therefore to be able to profit by the meaning which the events which happen therein have for our own active and practical life. But for intelligent beings the meaning becomes part of the environment. When we remember that the environment is that with which the individual is in relation, we shall realise that surrounding things which evoke no responsive interest play no part in relation to the intelligence, and therefore form no part of its environment. And when we remember that all experience is a mental product we shall realise that it is the meaning of things, rather than what we call the things themselves, that form the true environment of the developing mind.

Now let us suppose that two men, the one educated, the other ignorant, stand in the church of Ottery St. Mary, in Devonshire. The mere physical surroundings are the same. For both they have some meaning and significance. The solid walls mean barriers to passage outwards, the open doors mean lines of exit. For both, too, the church would have significance as a place of worship. That, at least, is part of the environment which begets, we may hope, the appropriate response in reverence of demeanour. But beyond this, what a difference in the environment! For the educated man the architecture is an environment full of historical associations. The columns and their capitals, the windows and their tracery, the forms of the arches, have a significance for him that is absent in the case of the ignorant man. The church and its village, too, suggest to him literary associations. Here Coleridge was born and baptized. This was the Clavering of Thackeray's *Pendennis*. Does not his education bring the one man into vital touch with an environment to the full significance of which the other is wholly insensible?

We start, then, with an environment of nature, men and women, and human products. But man has gradually elaborated a system of knowledge concerning the world in which he lives. This he has projected upon, and woven into the tissue of his surroundings. To this enriched environment we are the heirs. Newton has made the starry heavens an orderly system; Lyell has given to the framework of scenery a new significance. Darwin has helped us to see in plants and animals a plan which relates each with others. Historians, philosophers, and men of letters have taught us the significance of human life.

But to know this environment we must be conscious of its existence, its value for practical endeavour, and its worth for our ideals of conduct. This depends on experi-

ence. Let us consider, from the psychological standpoint, the nature of our experience in the affairs of daily life.

Psychology deals with states of consciousness. It is the study of their nature, their mode of origin, and the manner of their sequence.

Suppose you are ushered into an unfamiliar room, being a few minutes too early for an appointment. You look round and take stock of its contents. You note the furniture, the ornaments on the mantelshef, the pictures on the walls, the books on their shelves, the view from the window. All is new to you. You have seen none of these things before. You are made aware for the first time of a number of objects grouped in certain ways. Perhaps you admire the beauty of the view or the tastefulness of the furniture; perhaps you take a book from the shelves because its title interests you; perhaps, almost mechanically, you set straight a picture which hangs a little awry. You are gaining new experience; but this new experience is interpreted in terms of your previous experience. The particular things you see, the feelings they evoke, the actions they call forth, are new; but they belong to kinds of things, feelings, and behaviour which are quite familiar. Seeing the things, admiring them, doing something with them, are all modes of being conscious. In the unfamiliar room you have a sequence of states of consciousness a constituent feature of which is the sense of unfamiliarity itself.

How different the feeling when you return to your own cosy little room and glance round at its well-known objects. Your interview is over, and that is a relief. You did not have a very sympathetic reception, and it has left you a little ruffled. All this is part of your state of consciousness. So, too, is the soothing effect of your present surroundings. Everything has so much pleasant meaning for you. The print over the fireplace may remind you

of the painting from which it was engraved, and where you first saw it; the flowers in the vase, of the lane in which you plucked them, and of the bright companion who was with you. The clock may bring to mind its kind donor, and of the fact that a letter from him remains unanswered; the state of the fire, that a little judicious poking may be advisable, for it is your fire, almost a part of yourself, to coax and cherish at your pleasure. And then a photograph on your desk leads you gently on into a restful reverie concerning your past holiday. You briefly review this bit of past experience, and your states of consciousness are now almost wholly occupied by the changing figures of your day-dream. Images of pleasant scenes, memories of healthy walks or rides, reminiscences of congenial companions, come and go, enchained in a certain order by some community of interest; while other events, perchance those of former holidays, intrude themselves, dropping in like old acquaintances, unbidden but not unwelcome. And yet we should hardly say intrude; they are there because they properly belong to such situations as the reverie more or less faithfully reproduces.

Perhaps you had not realised that in your ordinary dealing with the common situations of daily life there are some of the materials with which the abstruse and difficult science of psychology is concerned. That is just because we quite naturally take so much of our everyday experience for granted. Simple and commonplace as it is, however, it forms part of the foundations of our mental life. Out of it arise the more elaborate products of abstract knowledge, strong emotion, and strenuous endeavour. We must first study the simpler states of consciousness before we can attempt to understand those which are so much more complex. That is why we have begun with quite ordinary occurrences. But let us note

that it is with the experience as such that the science of psychology deals. And in that experience there is a two-fold reference. There is a reference to the objects you see, to the events that are occurring or have taken place, to your present or past surroundings; and there is a reference to yourself as seeing them, as living or having lived in the midst of them, of being interested in them, worried by them or soothed by them, of behaving, or feeling a disposition to behave, in certain ways, in their presence. Sometimes we, so to speak, lose ourselves in our interest in things and events; sometimes we regard them as only contributing to our own pleasure or annoyance. But experience always has one or both of these kinds of reference, objective and subjective as they are termed.

Now any state of consciousness or, as it is sometimes called, field of consciousness includes all that is "in mind" at any given moment, understanding by the word "moment" a short but appreciable period of time, say one or two seconds. But what is the mind? Let us for the present leave this question unanswered. The term "mind" stands for a very general and abstract conception. Whatever the mind may be as an actually existent reality, comprising all our experience and all our knowledge, all our hopes and fears, all the impulses and motives which spur us to active endeavour, it is wider, fuller, richer, than any given field of consciousness. It somehow involves an available balance at the bank, from which the few coins laid down on the counter of consciousness are drawn. Or, to vary the analogy, the field of consciousness is the wine which our mental host places on the table from the bins of his cellar. Sometimes we feel sure that the sample provided comes from a well-stocked cellar of carefully chosen and matured vintages; sometimes we suspect that it has been hurriedly got in from the friendly grocer round

the corner. Our pupils are often shrewd enough to form a pretty accurate estimate of the source of what we place before them; whether it comes from our own mental cellar, or from the grocery stores represented by some half-crown text-book. What the mind is, then, we do not, for the present, attempt to determine. It suffices for us to realise that it is wider and deeper than the field of consciousness at any given moment. And it is this to which we must now direct our attention.

The first thing to notice is that the field of consciousness is often exceedingly complex, and seldom very simple; that is to say, there is not only a single object of sense or of thought, and nothing more; a number of things are present all at once, some in the foreground, some in the background. It is therefore necessary to analyse the field, and to distinguish its constituent features. Let us suppose that we are looking at the picture on the wall. There it is in what we may term the *focus of vision*. But we also see, less clearly, the wall on which it hangs, and perhaps much besides, in what we may call the *margin of vision*. As our eyes flit from object to object so as to bring to the focus what, but a moment ago, was in the dimmer margin, there is a succession of fields of consciousness in which the constituent features undergo a more or less continuous rearrangement. Furthermore, though we may pay little attention to them, save for purposes of analysis, there are other things present in what we may term the *sensory margin*; sounds such as the ticking of the clock and the crackle of wood in the fire-flame; scents, such as that of the flowers in the vase; pressures from what is in contact with our body, and those diffused sensory feelings of comfort or discomfort which are so hard to analyse. Any one of these may, in the process of analysis, leap into the sensory focus, the others slipping

away into the margin. Nor are objects of sense, knocking gently or importunately at what John Bunyan called the gates of the soul, all that may characterise the stream of consciousness; there is whatsoever these several objects may suggest or recall, memories of the past or anticipations of the future, far-reaching thoughts tinged with regret or with hope. They may remain in the background, or they may steal insensibly into the *focus of consciousness*. And, all the time, there is ever-varying rearrangement and resetting of the fields, with changes of their central points, and with much coming and going of impressions, images, and ideas. For a moment the scent of flowers is in the focus of consciousness, then this slips away into the margin as the vision of some quaint old walled garden steals upon us; our eye falls on the clock, and the position of the hands raises an expectation of the quarter's chimes or the striking of the hour; perhaps before the anticipation has been realised we remember that the clock should have been wound this morning. This kind of thing is familiar to everyone. A little analysis enables us to realise the complexity of the stream of consciousness.

Abundant opportunities of realising this are afforded by the practice of the class-room. Subject-matter, manner of presentation, the starting-point and past stages, the end in view and the course of development towards that end, effectiveness and a sense of failure or success therein,—all are present in varying degrees. Maintenance of discipline, voice-production and clearness of articulation, and a steady hold on the children's attention, no matter how habitual they may have become, are there in the dim background, unobtrusive but ready in case of need. The familiar desk and other furniture of the well-known room, the sight of upturned faces, any one of which at any moment may send a message which shall change the

course of our consciousness, the subdued shuffling of feet, the freshness or otherwise of the atmosphere, the pose of the body and position of hand or arm,—all of these contribute in their several degrees to that wonderfully complex state of existence which we term the field of consciousness. And behind all those upturned faces are similarly complex existences. Must we not realise this complexity, and endeavour to understand the conditions under which the subject-matter with which we are dealing may be brought to the foreground of consciousness in these young minds, and held there if we are to succeed in our work as teachers? They, too, have marginal constituents in the field of their consciousness, only too ready to usurp the central position, and render our pupils liable to the charge of inattention.

The consideration of such a case shows that the analysis of the field into focal point and surrounding margin does not suffice. There is the focal point of attention; but there is much besides in the *field of attention*. The whole development of the lesson in relation to the pupils is in the field of attention. The teacher probably does not pay any special attention to the position of his hands or the state of the atmosphere; though he *may* do so. They lie in the outskirts of the field of consciousness, present and to some extent exercising an influence, but in the *region of non-attention*. The whole field may therefore be mapped out as—(1) the focus of attention, (2) the rest of the field of attention, and (3) the marginal outskirts in the region of non-attention. This must suffice for a preliminary survey; we must remember that in succeeding moments we have successive fields of consciousness. Each of these, like the isolated film which forms one of the series which produces an animated photograph or cinematograph picture, affords a more or less complicated grouping of

constituent features. And in the sequence of fields there is a continuous series. The field of any one moment may differ from that of the preceding moment by the incoming of new features and the outgoing of some of the previous features. But much of the change consists in a regrouping of the old constituents. If this were not so there would be no continuity in the stream of experience.

We must now pass on to consider the nature of the constituent features—or *factors*, let us call them. We are well acquainted with the marked difference between the immediate and direct cognisance of surrounding things when they are actually present to the senses, and the revival of past experience when the objects themselves are no longer in sight or at hand. The distinction is so familiar, and under ordinary circumstances so complete, that there is little need of illustration. We are seldom in doubt whether we actually see or touch a thing, or merely have in the field of consciousness a revived image of the thing. Only in abnormal circumstances or under abnormal conditions have we any hesitation in saying whether an object is actually before our eyes or at our finger-tips, or not. And we may here neglect such abnormal cases. The facts being so familiar it is only necessary to give the terminology. All that is in the field of consciousness by a process of direct cognisance through sight, touch, hearing, smell, taste, and so forth, is *presentative*. And when we analyse this presentative field, each part of it which we interpret as a distinguishable factor, is an *impression*. It is a sensory impression; that is to say, a factor introduced by the stimulation of some organ of sense, such as eye, ear, finger-tip, or palate. Of such impressions your field of consciousness in the strange room was largely constituted. Afterwards, in your armchair at home perhaps, you recall the appearance of the waiting-

room. All that is in the field of consciousness through the revival of previous sensory experience is *re-presentative*. And when we analyse the re-presentative field, each part of it which answers to a direct impression is an *image*. The visible hands of the clock when our eyes fall on the dial are presentative; the chimes which we expect to hear in a few seconds are re-presentative; they are presentative when they actually ring out and directly affect our organ of hearing. Note that recollections of the past and anticipations of the future are at the moment of their occurrence present to consciousness, though they are not presentative. Their pastness or their futurity is a matter of reference—something about them which leads us to refer their presentative occurrence to some period of time other than that of the moment when they are images in the field of consciousness. And note that we are here somewhat extending the common use of the word “image.” The remembered musical chord or nosegay-scent is the image corresponding to some previous impression of hearing or of smell.

There are many kinds of impressions—more than those of the traditional five senses—which are dealt with in treatises of psychology. Those which play an important part in the daily routine of educational procedure are—(1) the visual impressions, those of sight; (2) the auditory impressions, those of hearing; (3) impressions of touch, especially those of the hands and fingers; and (4) the impressions afforded by the movements executed by our limbs, our fingers, our eyes in their sockets, and so forth. Those which fall under the fourth heading are of very great importance. Assure yourself of their existence as direct modes of experience. Look at the clock-face, or any other particular object; shut your eyes; and, not too hurriedly, point your finger at the object. Do this twice

or thrice, still with your eyes shut, and note your states of consciousness. You will be able to note two things. First, you picture to yourself, though you do not see, the movements of your finger, hand, and arm; you have a series of visual images. Secondly, you feel pretty clearly the movements of, and in, the limb as you bring it into position. Draw a circle in the air or on the blackboard with your eyes shut; again you probably visualise the sweep of your arm, but you also feel with surprising distinctness the impressions due to its movement. Walk about the room; every change of position of your legs is affording you direct information of the movements they are executing. Let your eyes wander from object to object, and pay attention to their movements in the sockets; a little practice in self-observation will enable you to feel them quite clearly. Now hold up a pencil or penholder about eight inches from your face and in the line of vision of the picture on the far wall. Alternately fix your eyes on the pencil-end and on the picture, and attend to the impressions in and round your eyes. Do you not feel quite plainly your eyes going, so to speak, from the one to the other? The focussing of the two eyes, and sundry motor adjustments within each eye, give rise to impressions just as real and direct as those of sight or of hearing. And to all these impressions there are corresponding images. You can recall or imagine what you would feel if you lifted your arm and placed your hand on the back of your neck, and what direct experience you would have if you were in the act of kicking a football. In doing so you call up re-presentative images which answer to the presentative impressions due to the actual execution of the movements.

I have said that the four chief kinds of impressions which play their part in the ordinary routine of educa-

tional procedure are the visual, the auditory, those of touch, and those which accompany active behaviour. Any or all of them take part also in giving rise to re-presentative imagery; but probably in varying degrees in different individuals. One or other may take the lead, and be dominant in revival of what has occurred in past experience. For example, three men go to an operatic performance, an artist, a musician, and an actor. In subsequent memory the artist may see most clearly the pictured scenes; auditory images and those of action may play only a subordinate part. His type of imagery is mainly, but probably not exclusively, visual. The musician perhaps recalls most vividly the melodies and harmonies, the rich sound effects; but if he is a violinist or a singer he may, both when he hears the opera and when he recalls it, supplement the auditory impressions or images with those re-presentative of what it would feel like to play this passage or sing that aria. On the other hand, the actor may have a strong tendency to reproduce the gestures and attitudes of the players: he cannot sit still when he tells you about the piece; he must re-enact the scenes and mimic the performers on the stage. His type of imagery is predominantly that which introduces motor activity. Some of us remember best what we have read ourselves, visualising the words and sentences; others recall more clearly what they have heard, having clear auditory images of the tones and inflexions of the voice. Yet others find that they revive with most ease what they have read aloud, or at any rate with silent movement of the lips, or what they have written. The typist may clearly recall the movements of the fingers in tapping off the words; and so on. It is not unlikely that we are born with, or inherit a tendency for one kind of imagery to predominate over the others; but the emphasis on one type is

also largely due to education in a broad sense of the word—that is to say, the outcome of the predominant training in the use of one or the other mode of imaging. The teacher should therefore afford opportunities for the development of a mixed type in which all forms of imagery are present, co-operating with each other in reproducing all forms of serviceable impressions. This is, of course, familiar to us in educational procedure. In an object-lesson we let the object appeal directly to all the senses which can be affected by it; we give the child opportunities not only of seeing it but, as far as practicable, of handling it; we also let the child hear the names of its parts, see them written on the blackboard, pronounce them, write them down, and so forth. We have learnt by experience that this varied appeal to different modes of dealing with the object, and with the words by means of which it may be described, makes the child remember it all more easily. But we may fail to notice that through the object-lesson we are affording a training in the establishment of related modes of imagery which has an influence in development, extending far beyond the limits of the object-lesson.

There is one more group of impressions to which only passing allusion need here be made. When you read some particularly thrilling chapter in a novel, or see some picture which stirs you deeply, or listen to some piece of music which appeals to you strongly, do you not experience a quickening of the pulse, a catch of the breath, and much besides, tingling through your bodily frame? Such experiences are accompanied by a toning up of the muscles. By appropriate instruments it may be shown that under such circumstances the heart-beat is increased, the circulation quickened, the respiration rendered fuller and deeper, the muscles braced up. All this gives rise

to a voluminous and massive group of organic impressions which are markedly present in all strong states of emotion. There are corresponding images. But when they are revived there is generally also a revival of the impressions themselves. Our hearts, respiratory organs, and muscles are again actually toned up to a state of increased vigour.

So far, then, we have impressions of various kinds, and their answering images as constituent factors in the field of consciousness. The former are presentative, the latter re-presentative. It will be noticed that the word "re-presentative" is printed with a hyphen—being pronounced with an accent on the "re." So written and pronounced it serves to distinguish the images which are revived in the field of consciousness from the presentative impressions. But the impressions are always particular and individual. If we let our eyes range over a flock of sheep, each individual animal may come to the focus as a clear-cut impression. But if, as we sit at home, we recall our experiences in the field, what we visualise is not any particular sheep, with all its delicate shades of difference from other sheep, but what is common to a number of individuals. We can indeed visualise either a white sheep or a black one; but neither of them has to the full that perfectly clear-cut individuality which the impression of this or that animal would have. Just as the word "sheep" is a common noun, or a name common to a number of individuals, so is our image of a sheep, to some extent, a common, or to employ the technical term, a *generic image*. Such generic images are sometimes likened to composite photographs. If we have a negative plate whose period of exposure is twelve seconds, and expose before it six similarly arranged photographs of six different sheep, each for two seconds, the negative will receive six

superimposed impressions, and the positive obtained from it will give a composite portrait combining the salient characters of all six. To this composite portrait the generic image is sometimes likened. And in the case of the sheep, the analogy (so long as it is regarded as only an analogy) may be helpful. But if we take a composite photograph of six triangles—equilateral, right-angled, scalene, and so forth—we shall get a more or less blurred positive or the result of six faint and under-exposed negatives. When we visualise a triangle, the image is not of this kind. It is sharp and clear-cut. It is a particular image which stands for any member of the class or group of figures. It is thus not only re-presentative in the technical sense above defined, but also representative in the ordinary sense of the word with its common spelling and pronunciation. The images which appear in the field of consciousness at the bidding of such words as “park,” “cottage,” “tree” (supposing that we do visualise), are probably representative as well as re-presentative.

Now it is clear (and the fact should never be forgotten by the teacher) that re-presentation is entirely dependent on previous presentation; in other words, neither we nor our pupils can recall an image of that of which we have had no direct experience. Even the products of pictorial fancy and imagination—the situations portrayed by artists in word-painting—are but a regrouping and recombination of the materials with which our past experience has made us acquainted. If a poet or novelist describe for us the flowing river, gleaming sands, background of mountains, hushed stillness broken only by the low plash of the wavelets and the sad cry of the sea-mew, yacht beating up the wind, and beneath the ruined boat, half-buried in the sand, a youth and a maid, we have re-presentative and representative images, because we have had presentative impressions of

such things. But if he introduces an oyster-catcher by the water's edge, there will be a blank in our picture unless we are familiar with the black-and-white plumage and orange bill of the bird, which in the North is called the sea-pie. False images may perhaps be suggested by "oyster-catcher" and "sea-pie"—perhaps of a man with a shrimping-net, perchance of a weird dish of strange sea-hares and sea-cucumbers. But supposing that the word has at first no definite meaning for us, still we can, in such cases fill in the blank to some extent by reading descriptions of the bird, hearing about its form, size, markings, and mode of life, seeing pictures of it, and so forth; utilising impressions of which we have experience, to build up a *substitutive image* of that which we have never actually seen. Such descriptive work must of necessity occupy a considerable place in educational procedure. But we must not forget that descriptive information is of much less value for the great majority of our pupils than actual observation, which is the true and sure basis of practical working experience. Think of some rare plant which you have seen and examined with care, and of some other plant, the description of which you have read and studied with equal care. Which of the two stands out with greater vividness before the mind's eye; of which do you remember the salient features the more distinctly? Can there be any question as to the answer? Substitutive images are the makeshifts of educational procedure, at any rate in its earlier stages. But they increase in value and importance as the body of direct experience grows richer and more coherent.

We must now pass on to the consideration of the field of consciousness from a somewhat different point of view. Again let us revert to the unfamiliar room into which we are ushered. The field is fully occupied with a number of impressions. At any moment one of these, say the clock

on the mantelshelf, is in the focus of vision and of attention. The others are grouped round it in the margin of vision, the picture above it, the fireplace below, the bookcase to the left, the cabinet to the right, and so on. This grouping involves the *relations* of the impressions within the field. Note that just in so far as there is a field of consciousness, with several or many impressions or images as constituent factors, these must be related to each other in certain ways. In the visual field the centre of reference for the spatial relationships is, for practical experience, the focus of the field—that particular impression to which attention is directed. It is a constantly shifting centre. As our eyes flit from object to object the focal impression changes, and the space relations of other objects, more dimly seen, are re-arranged. But this does not go on aimlessly. Suppose that you are one of those natty persons who are worried by crooked arrangements. As you look at the clock you notice that the picture to the left hangs a little awry. Instantly your eyes leap to it so as to make it focal. Though you feel, perhaps, that it is no business of yours, you stretch out your hand and set it straight. We now see the practical value of the relationships in the field of consciousness. The impression of the picture in the margin of vision means so much turning of the eyes to make it focal; and this means so much walking towards it, and reaching up of the hand to set it straight. The value of a field of consciousness is for behaviour; and the act of behaving itself gives constituent factors in the field. That is where the importance of impressions due to behaviour in the execution of appropriate movements becomes evident. For practical experience, all the commoner relationships, such as those we express by the words larger, smaller, heavier, lighter, nearer, farther, rougher, smoother, and so forth, form parts of a presented situation actually before

us. This is heavier than that; one object is nearer than the other; the marble shelf is smoother than the tablecloth. And the outlook is essentially practical, with direct reference to behaviour. The greater weight of this chair means a greater output of muscular energy; that more distant book on the table means a longer reach; the rougher tablecloth will afford a more secure surface than the marble slab for this photograph frame.

But we say that this chair *looks* heavier than that; the tablecloth *looks* rougher than the polished marble; and so on. What do these modes of speech signify? This: that the visual impressions have meaning for other modes of experience; that they suggest certain modes of behaviour, or at any rate what would be the result of so behaving. The visual impression as such is presentative; but it carries with it a fringe of re-presentative meaning for practical purposes; and this meaning has been acquired through previous experience. The infant has a great many impressions which as yet have no meaning. But every hour and every day he is acquiring fresh experience, and every hour and every day the impressions carry more and more meaning. For us who have had so much experience and in such varied ways, the field of consciousness is a complicated product of the presentative material of impressions, and the re-presentative supplement of meaning. And any re-presentative image will have its re-presentative fringe. As I write, the sounds of a dog's bark fall upon my ear; it is an auditory impression which at once suggests "Nibs," the black Aberdeen terrier; and this again suggests that I should open the door and let him in. It has meaning for practical behaviour. And the practical behaviour is of such a familiar kind that much of its execution lies in the field of non-attention. I so far attend to "Nibs" and his needs as to go and open the door for him, but the getting

up from my seat and walking there requires no attention. I have done this kind of thing so often that it is wholly subsidiary to the purpose it subserves.

In our adult years a great deal of the business of life is transacted in the marginal or subconscious region. In matters of skill, for example, though the acquisition and perfecting of control over our bodily activities is focal and demands attention, yet when the skill has been acquired and is well established, the subsequent performance of the activities is to a large extent relegated to the margin of non-attention. We learn to walk, to run, to knit, to play the piano, to ride a bicycle; and the learning requires constant focal attention. But when the skilful performance of these actions has by practice become perfect, we may do any of these things, and do them well, while the field of attention is occupied with other impressions. The peasant woman knits and walks; but in the focus of her consciousness is yonder fair-haired girl whom the stalwart young fellow is, quite unnecessarily, helping over the stile. The pianist's fingers are running softly over the keys; but his eyes and thought are fixed on his mother's portrait. The cyclist bowls along the road; but it is the delicately-shaded greenery of the spring that holds his attention. And in these cases it is probably incorrect to say that the actions are performed unconsciously. The word subconsciously better conveys the fact that they are carried out within the region of non-attention. We are dimly aware of what is occurring there; but only if something goes wrong in the subconscious procedure does the matter come into the field of attention. Thus the cyclist guides his machine, avoids stones in the road, and adjusts his output of energy to the gradient in response to stimuli coming from without. But the skill he has been at the pains of acquiring has become so far a habit that it no longer

requires his focal attention. Marginal awareness suffices for the guidance and control of his machine. With regard to what takes place in the subconscious region it is necessary to exercise self-observation. Only by doing so can one fully realise all that occurs in the margin of consciousness. Paradoxical as it may sound, the only way to learn how much goes on in the region of non-attention, is to pay some attention to it. Of course it is then no longer in that dimmer region. But only thus can we realise that it *was* there before we began to attend to it.

We now have as constituent factors of states of consciousness, either in the field of attention or the region of non-attention, impressions and images, having certain relationships, and more or less suffused with meaning for practical behaviour as the outcome of previous experience. So far I have said nothing of *sensations*. The term is sometimes used as the equivalent of what I have spoken of as impressions. But it may be more conveniently used for the elementary constituents which may be disclosed by an analysis of the impressions themselves. For example, the same note played on the flute, the violin, and the cornet, gives in each case a different auditory impression. When the note is analysed the difference in timbre is found to be due to certain overtones or partials accompanying the dominant tone. These afford sensations which contribute to produce the particular impression. Thus an impression may be analysed into constituent sensations which combine to give it a special character. So, too, the impression produced by the flavour of coffee may be analysed into sundry taste-sensations combined with sundry smell-sensations. These can be distinguished; and the coffee-taster has to cultivate such analysis as shall enable him to recognise special aroma. One more example will suffice. The impressions we

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receive from the movements of hand and arm are made up of many sensations from the muscles and their sheaths, the tendons, the skin, the smooth surfaces of the joints, and so on. But though they may be thus analysed by specially devised means, they are, for the practical purposes of daily life, just accepted as impressions which have meaning for the guidance of behaviour. As we have seen, even the impressions are the results of an analysis of the field of consciousness; but the analysis here into constituent sensations is carried further for the purposes of scientific inquiry. It only remains to add that sensations are presentative: what answer to them in representative imagery are sometimes spoken of as the *sensory elements*. These coalesce or combine to form images.

I am well aware that all this terminology is at first puzzling. Familiar words are used in special ways and with restricted significance. All I can do is to try and make the usage clear. I see before me an inkpot. I have a visual impression. Now the impression as such is only the visual part of the matter; nothing more. It is what I actually see; the bare sight of the thing. In so far as it has meaning, suggests that the thing is hard, and smooth, and cold—suggests to me as I write that I can dip my pen into its contents, it is related to my experience of inkpots. An impression which thus carries a fringe of meaning for one's practical behaviour is termed a *percept*. We shall have more to learn about percepts later on. But the impression I receive is made up of a number of visual sensations. I can analyse it into darker and lighter portions. These sensations, each of which is so elementary that I can analyse it no further, coalesce or combine to form the impression as a whole. If I form a mental picture of the inkpot in another room it is an image. This, too, may carry perceptual meaning. It is

re-presentative as a whole, and made up of re-presentative sensory elements. All this, I am aware, is somewhat puzzling. But I am endeavouring to help you to frame definite ideas concerning the constituent factors in those very complex existences—states of consciousness.

The term *idea*, however, like the term *sensation*, is one which is used by different writers with a varying range of significance. Sometimes it is used in such a sense as to include images, and even impressions. I propose to use the term only for what are called general ideas or abstract ideas. They are the constituent factors of those states of consciousness which deal with systematic knowledge. Let us take one or two illustrative cases.

The familiar word "clock" may first recall to your mind an image of that particular clock which stands on the mantelshelf of your room; it revives part of a pictured situation; but that is not the general idea which the word suggests. What, then, is that idea? Is it not that of a piece of mechanism which serves to mark the course of time? The idea is perhaps better expressed by the old-fashioned word "timepiece." The word and its idea is applicable to any clock. If you recall your experiences of a number of clocks you may have, in succession, a number of images; but common to all of them is the idea of timepiece; that is the force of the word "general" as characteristic of the idea. You also get rid of all differences of detail, size, shape, material of the case, and so forth; that is the force of the word "abstract," which is also usually applicable to the idea. Notice, however, that the word "timepiece" is more general and abstract than the word "clock"; it is common to both clocks and watches, and, perhaps, sundials. And notice, too, that the particular clock of any

given situation may be regarded, and *is* regarded from the point of view of systematic thought, as an example or illustration of the general and abstract idea.

"Colour" is an abstract and general word. What does it suggest when it meets your eye or falls upon your ears? Different people will give different answers to this question. Suppose it suggests a geranium plant, with its scarlet flowers and green leaves. This may exemplify and illustrate, but it does not exhaust the idea of colour. In any pictured situation you may visualise something to which the word and its idea applies: but you can form no image of the idea as such, that is to say in its generality and abstractness. It refuses to be imaged save in its concrete examples. It has therefore been asked: "What is this so-called abstract idea, but a general *name* which is applicable to a number of particular cases?" Still the name or word does something to guide our mental processes. If so, what does it do? Try and answer this question for yourself. The following may be helpful as a point of view. You say to a class of children: "To-day we will talk about——" Before you have filled in the missing word the children's minds are thrown into a state of vague expectancy. You are going to talk about something; but it may be anything in the world of experience. Now you add the word "colour." The range of expectancy is limited to what is called a definite universe of discourse. The mind hangs poised, as it were, over a certain area of sensory experience, and perhaps perches now on this and now on that example. You proceed: "We will begin by selecting 'blue.'" The range of expectancy is further limited. Thus you may pass to "peacock-blue," "pale peacock-blue," and at last to "*this* pale peacock-blue feather." Thus you have reached by successive stages the particular example in a

presented situation. But it is a particular example of a general and abstract idea. From this point of view we may regard ideas as *stages in the limitation of thought*.

• Now there is a word which I have had frequent occasion to use, namely "object." Let us inquire what idea is suggested by it. We all know the common use of this word for the things around us—the writing-table, the ink-stand, the pen-wiper, the letter-weight, and so on. These are objects which directly appeal to our senses—objects of which we gain experience through impressions. The limitation here, therefore, is to objects of sensory experience. Is the word "object," then, as applied to any one of these things around us, only a different name for what we have already termed an impression? No: a little consideration will show that it implies something more. The golden pippin which we see on the sideboard not only does afford a visual impression, but it can afford other impressions. We can touch it, lift it, smell it, bite it, taste it. When we describe an object of sense we write down a list of the various kinds of impression which it can afford, and the ways in which they are related. All of this is not, however, suggested by the sight of an object; at most the actual impression is surrounded by a sort of marginal fringe of further possibilities for experience, any one of which may be, but none of which need be, within the field of attention. Which of these many possibilities for experience is actually recalled and attended to depends upon the practical requirements of the situation. Water may at once suggest something to drink, something to wash in, something to boil, something to put flowers into, something wherewith to soak peas, something which will extinguish fire, and so forth. The situation of the moment determines which. In our class-teaching we may have to refer to quicksilver or mercury in connection

with its weight, its fluidity, its metallic lustre, or its expansion with rise of temperature. Which of these several properties is made prominent depends upon the part of the system of knowledge we wish to bring into the field of attention.

The object of sense, then, is a centre of reference for actual and possible impressions. It is what we can see, touch, handle, manipulate, and examine. It has meaning for our practical experience. It is that to which our percepts have reference when we are dealing with things in the world in which we live. We become acquainted with it by *perceptual process*. But we also speak of objects of thought. Infinity, empty space, virtue, ambition, states of consciousness may be objects of our thought. They involve abstract and general ideas, and those factors in consciousness which we shall learn to call *concepts*. They are founded on, or extracted from, our practical experience; but they have special reference to constituent factors in the systematic knowledge by which that experience is interpreted. They belong to what is termed *ideational process*. The general and abstract idea to be conveyed by the term *object* is therefore a centre of reference—(1) for actual or possible practical experience; (2) for actual or possible systematic thought. But it implies someone who experiences and someone who thinks. This is the other side of the twofold reference of which I spoke before. The idea to be conveyed by the term *subject* in psychology is the centre of reference for actual or possible states of consciousness, as mine (for me) or yours (for you). Around this subjective centre of reference cluster our pleasures and pains, our feelings and emotions, our hopes and fears, our strivings and endeavours. These with the related impressions, images, and ideas which call them into being, are constituent factors in our states of consciousness.

CHAPTER II

PREPARATION AND APPLICATION: KNOWING, FEELING, AND DOING

WE have seen that the word "object," in its wider significance, denotes anything which is or may be brought to the focus of our sensory experience or our thought. We only attend to it fully—apply our minds to it—when it thus occupies a central position. Thus in a nature-study ramble, a water-rat beneath the river's bank, a hovering kestrel, a tree-creeper on the elm-trunk, may be an object of sensory experience. But, as we say in common speech, there must be something *about* them which attracts the attention, something which brings them to the focus of consciousness, something which ministers to mental application. What is this something? Does it, so to speak, reside in, so as to be limited to, the impression we receive,—that is to say, the bare presentation to the visual sense? Is it the mere strength or insistency of the impression? Not wholly, at any rate. No doubt strong impressions, insistent impressions, do arrest the attention; but so also do relatively weak ones. Amid the glare of familiar poppies in the field, some small rare flower may claim our especial notice. It is not, then, necessarily the strength or insistence of the impression in its own right, as a presentation to the senses, that suffices to bring it to the focus of attention.

Whether a child will or will not notice a tree-creeper slipping round the trunk of the elm depends far more on the character and experience of the child than on the strength and insistency of the impression as such. We have seen that the object is a centre of reference for actual and possible impressions. For the observant child, who has taken country walks under sympathetic guidance, there is an expectation that the tree-creeper situation is likely to develop or change in certain ways. That is the meaning which the sight of the bird has acquired through previous experience. And this expectation of further development is an important factor in the attention-process. But this is supplementary to, and not merely part of the bare presentation. Nor would there be any expectancy save under the conditions of some sort of preparation through previous experience of like situations. The child, too, is thrown into a mental attitude of alertness: the impression begets an active response, some form of application of the mental and bodily energies, if it be only in the act of further focussing the attention. What does all this imply? Does it not imply that for the attentive consciousness the impression is not isolated and independent? The visual impression tree-creeper is, for the observant child, related to the existing body of practical experience. It has meaning; and it can only be assimilated on the condition that a relevant portion of that experience is drawn up into the field of consciousness. By the term "assimilation" we are to understand that the new experience comes into line with similar experience previously gained, within which the new features are incorporated. If we speak of the tree-creeper as occupying the focus of attention we must remember that there is much more in the field of attention. All that is interesting in the situation and its expected development constitutes the

field of attention, around which there are a number of subconscious impressions which are contributing to the field of consciousness as a whole, but are irrelevant. These are within the surrounding region of non-attention. They are being attended from and not attended to.

Now suppose that a boy or girl is watching a partial eclipse of the moon. The occurrence will only have significance if there is some comprehension of the manner in which such an event is caused. No heed (of the intellectual kind) will be paid to it unless the relevant portion of a system of knowledge be drawn up into the field of consciousness. Then attention will be paid to it as a particular case which illustrates certain astronomical principles. It can only be intellectually assimilated in its relation to that part of the system of knowledge which it illustrates. The diminishing crescent of the moon is in the focus of attention; but all that it signifies is in the field of attention. And the fact that it has such significance implies that this changing visual impression finds its due place in reference to the system of knowledge to which it is related. There may be much in the field of non-attention—but this is irrelevant, and may be—nay is—neglected. Now it is clear that such application of thought is impossible in the absence of systematic preparation of the intellectual kind. For the boy or girl who had learnt nothing whatever about such events, neither the appearance of the moon nor the word “eclipse” would have any significance.

It would seem, then, that the “something” about an impression, or the idea it suggests which attracts attention,—or more accurately, is the condition which is necessary for the attention-process,—is the connection it has with the body of experience, or the system of knowledge; that this implies what I have spoken of as meaning or as signifi-

cance; and that it is dependent upon some form of previous preparation.

I have here drawn a distinction between the body of practical experience and the system of knowledge. "I cannot, however, expect that the grounds of this distinction will at present be clear, or its validity admitted without question. It must now suffice to say that, by using the phrase "a system of knowledge," I wish to imply a scheme of thought of which the constituent factors are general and abstract ideas. It comprises the net results of a number of the situations which have been presented to practical experience, from which the essential features have been selected and *rebuilt as an ideal construction in thought*. Much of our educational work is directed towards assisting our pupils to form such ideal constructions, such schemes of thought as may be applicable to concrete experience.

Now we have seen that the mind, however we may define it, is fuller and richer than any given field of consciousness. It may contain, somehow stored up in it, a wide body of practical experience, an adequate fund of systematic knowledge. But this is serviceable, at the moment of consciousness, that is to say, on any particular occasion, only in so far as the relevant part of it is drawn up into the mental field so as to enter into the relationships which are essential to the attention-process. Presumably we all know how hard it is, especially if we are engrossed in some other inquiry, to answer off-hand a difficult or out-of-the-way question which is suddenly propounded, though we are fully aware that we *can* answer it. We say: "Don't ask me just now. I'll think it over and tell you presently." This does not necessarily imply that we must hunt the question up in some book. We need do nothing of the sort. What we have to do is to keep the question before us until it

calls up into the field of consciousness the relevant part of our systematic knowledge to which the problem is related. This may require some purposeful effort of recollection. We have to put the problem in its appropriate surroundings,—its proper environment. Then the answer comes to mind. We speak correctly when we say that we have to think *about* it. Not improbably when the question is asked we feel little or no interest in it or the answer. But when we think the matter over, and get, as we say, the bearings of the question, we feel old interests revive, because the relationships are brought again into the field of consciousness.

Suppose, then, that a teacher is accustomed to deal day by day with some special system of knowledge, say in physical science or mathematics. He enters the classroom, and at once, or after a mere glance of preparatory thought, the part of the system relevant to what he is going to teach is present in the field of consciousness. What he is about to demonstrate is set in its due relationships, and is thus for him suffused with interest. He is prepared to start at once and take up his theme exactly where he left off last week. But is it reasonable that he should do so; or, if he does, that he should expect his pupils to be in a position immediately to attend and to assimilate? Some twenty or five-and-twenty boys have either come into the classroom fresh from the pleasant situations of the playground, or with the field of consciousness still partially occupied with the preceding hour's French or history lesson. What they have previously learnt in mathematics or physical science, is therefore out of touch with the present stream of consciousness. Hence the wise and skilful teacher occupies the first part of his allotted hour in recapitulation, the object of which is to prepare the field of consciousness, to draw up into the

field of attention that part of the system of knowledge which bears upon the new facts or principles which he proposes to introduce or present. Then they may be clearly understood, because the relational ground has been prepared; then they may prove interesting, because their significance will be adequately grasped; then the system of knowledge will be extended and strengthened, and made ready for application to further examples as illustrations of the principles which have been established.

But after all, this immediate preparation of the field of consciousness depends on a great deal of previous preparation of preceding fields of consciousness. Education should be a continuous and systematic process, by which the mind is prepared for further development, always with a view to the application of the knowledge thus gained to some definite purpose, either in dealing with the situations of daily life or in attainment of wider and more exact knowledge. We may therefore say that preparation is always the educational means; application is always the educational end.

If we consider the matter in a yet broader and more general way, applying the term *education* not only to the special ministry of the teacher, but to the learning of the lessons of life from the cradle onwards, still we shall find that preparation is essential to application, and that application in itself constantly affords a preparation for nicer, more delicate, more exact and wider application. The infant comes into the world with certain inherited dispositions. What shall we understand by the word "dispositions" thus used? I think we must understand that the child inherits a nervous system, the functional parts of which are so disposed or arranged that when certain sensory nerve-endings are stimulated by presentations from the environment, there follow certain more or less definite

modes of responsive behaviour. If, for example, you place your finger in the palm of a newly born child, the little hand will close on it and grasp it firmly. But what is this but an application of the vital energies? And does it not depend on racial preparation, which is transmitted to the infant through heredity? The inherited disposition is at the outset a physiological disposition. As we watch the infant during its first weeks of life we observe many apparently random, but really more or less adaptive movements which are varied forms of instinctive application in response to sensory presentations. Here is the raw material of behaviour. And here, too, is the raw material of experience. It is probable that experience itself is not inherited. What is inherited is a bodily organisation and a nervous system, the functional working of which gives rise not only to behaviour, but also to states of consciousness. If we assume that the child is conscious of its earliest forms of behaviour, then the sensory presentations and the resulting responses combine to form a dim awareness of the situation as developing on hereditary lines. The physiological disposition in action gives rise to a psychological disposition in consciousness. This disposition involves an awareness of the presented environment, and of the behaviour adapted thereto, and it constitutes a bit of what we may term the primordial tissue of experience. Now the energy of the response in behaviour varies with the organisation and sensitiveness of the total disposition, and on the strength and efficiency of the presentation therein. If we apply the term *impulse* to this variable dynamic factor, then we may say that the energy of the response varies with the strength of the impulse.

The last paragraph will probably present difficulties to the reader who is ignorant of the physiology of the nervous system, and who has not had occasion to consider

the relation between physiological changes and states of consciousness. Although but little can be said in a short space that is helpful—that little consisting of mere information—a few salient points may here be given. In the first place we all know that conscious experience is in some way connected with the brain. The exact nature of the connection is not known. We must be content to accept as a working hypothesis that it is an accompaniment—or in technical phrase a *concomitant*—of the functional activity of the outer layer or *cortex* of the *cerebral hemispheres* which occupy the upper part of the skull cavity.

To the brain, or its continuation in the spinal cord, which runs down the back within the arches of the vertebræ there course inwards from all parts of the body a vast number of delicate nerve-threads, which are collected in larger strands termed the *afferent nerves*. They are the channels of communication which carry inwards what we may call nerve-currents from the organs of special sense—from eye, nose, tongue, ear, and skin—from the internal viscera, and from the parts concerned in bodily movement. Unless or until these currents reach the cortex of the brain there are probably no conscious concomitants. The changes are purely physiological. Other nerves run forth from the brain or spinal cord (which are together spoken of as the *central nervous system*) and carry outwards the currents which cause the muscles to contract, the glands to secrete, and the blood-vessels to dilate or the reverse. These are termed the *efferent nerves*. After the currents have left the cortex they are (we assume) outside the sphere of conscious concomitance. If we are aware that our muscles are contracting, our salivary glands secreting, or our blood-vessels tingling, this is because afferent currents are running inwards from these parts to the cortex and setting

up changes which are accompanied by these modes of consciousness. We cannot enter further into details, which would indeed be unnecessary for our present purpose. But it should be clearly grasped that there are two sets of nerves, indistinguishable in appearance but distinct in function, the one set afferent, carrying in currents to the central nervous system, and the other set efferent, carrying out other currents from the nerve-centres. The currents in the one set always flow inwards, those in the other set always flow outwards. And it is only the inward-flowing currents which, if they reach certain parts of the brain, set up changes the conscious concomitants of which contribute to experience.

Now let us consider one or two examples which may serve to illustrate the working of the mechanism. If, to take the instance above given, you place your finger gently in the half-open hand of a sleeping child, the little fingers will close over it and clasp it lightly. The touch of your finger on the palm affords what is termed a *stimulus* to the sensitive structures to which the end-threads of certain afferent nerves are distributed. Nerve-currents course inwards to centres in the spinal cord between the shoulders, throwing them into functional activity; and from these centres currents course outwards, by efferent nerves, to the muscles of the hand, causing them to contract in the orderly fashion necessary for grasping. The child still remains asleep, probably is unconscious of either the touch or the responsive movement. The currents either do not reach the cortex or stimulate it so slightly as not to call forth those brain-processes which accompany attention. None the less the bodily response is the quite definite one which we call grasping the finger.

Let us now take a second case. In the reptile house at the Zoological Gardens I watched, through the plate-glass,

a cobra with expanded hood. Suddenly, as I had expected (since the attitude of the snake had meaning for me), it struck violently towards me against the glass; and I started back. The rapid movement of the cobra stimulated the retinas of my eyes: nerve-currents coursed inwards and set up a disturbance in nerve-centres at the base of my brain; efferent currents coursed outwards to the muscles of my neck and limbs, causing me (that is my body) to start backwards. I did not intend to withdraw my face from near the glass. Indeed, I knew perfectly well that the cobra could not possibly reach me. I expected it to strike, and intended (if possible) not to start. But the direct response to stimulation was swift beyond control. Still, and here this case differs from the last, I was fully conscious not only of seeing the cobra strike, but also of my own responsive movement. Nerve-currents went up to my cerebral cortex and set up a disturbance there which had vivid concomitants in consciousness. But the disturbed lower centres sent out those currents which made my muscles work, so rapidly that restraining currents from the cortex could not check the involuntary recoil. And what passed through the mind a moment afterwards may be expressed in the words: "Hullo! I've done it after all." But it was rather my body that had done it than the thinking part of me, which did not even consent.

These two cases show us that there are certain involuntary and automatic responses which are carried out by the body, independently of conscious guidance and control. But it may be said that though the sleeping child may not consciously guide its fingers in the act of grasping, still it could not close its hand in this definite way unless it had learnt to grasp. That, however, is not so; for the newly born child will grasp and cling to your

fingers so firmly that it may be lifted from the bed. And the newly born child has had no opportunities of learning how to grasp.

Among the lower animals, and in a less degree in the human infant, there are a number of responses which are carried out without learning or practice, the first time the appropriate stimuli occur. This kind of behaviour, which is prior to any experience of its results, is involuntary, and is dependent on an inherited organic mechanism. When it rises to a certain level of complexity it is termed *instinctive*. Thus the newly hatched chick pecks at grains of food or other small things within striking distance; when part of the body is irritated the little bird scratches at the spot; it has not to learn how to peck so as to seize the grains, nor where to scratch so as to allay the irritation. Soon after it emerges from the shell a young moorhen or duckling will, if it be placed in water, swim with orderly strokes. The small birds have not to be taught how to perform these acts, or to learn how to do them as we learn to ride a bicycle—the organic mechanism is inherited, its working is involuntary and the actions are instinctive; that is to say, they are not dependent on previous individual experience.

The important point, then, for us to notice, if we would understand the beginnings of mental life in the individual animal or child, is this: that at the start of life it behaves involuntarily in certain ways because it inherits the appropriate mechanism. It commences the business of life as a going concern, to which as an organism it is heir. And through its instinctive behaviour ready-grouped data are afforded to consciousness as a basis for experience. Granted that the duckling swims involuntarily, just because, as a water-bird, it is so built, through

heredity, that the stimuli afforded by partial immersion inevitably start this particular and appropriate behaviour; and granted that it is conscious, that is to say capable, of acquiring experience; then that which is presented to consciousness is what we may term an "instinctive situation" developing in certain predetermined ways; and this as a whole is a bit of experience that is capable of further development. The sight of water thereafter has meaning; experience has taught the little bird that water is something to swim in.

Let us now try and bring the facts which we have briefly reviewed with regard to involuntary and instinctive behaviour into line with the theme of this chapter. May we not say that, whatever biological hypothesis we may accept with regard to the origin and evolution of instinctive responses, they are the outcome of a prolonged process of racial preparation for the particular activities which find their proper application in responses adapted to the circumstances of the case? The instinctive situation affords a presentation. The application follows involuntarily because of the foregoing racial preparation of the organic mechanism for its appropriate mode of working. The duckling comes into the world specially prepared through heredity for certain modes of response; when it is partially immersed in water an instinctive situation is presented; and the result of this presentation is the peculiar application of its hereditary power of swimming. We have to remember, then, that the newly born infant is the embodiment of a large amount of organic preparation, and that its earliest activities are the application of its instinctive dower, at the bidding of certain presented stimuli.

We may now pass on to consider very briefly a simple case, which may help us to distinguish truly instinctive

behaviour from intelligent behaviour, due to the individual acquisition of experience. Young chicks, hatched in an incubator, will peck instinctively at small things within reach. Here we have automatic behaviour directly due to the working of inherited nervous mechanism. But suppose we give them some ladybirds. They will peck at these insects as they peck at other small things. There is no sign of any inherited experience of the fact which the first trial at once discloses, namely, that the ladybird is nauseous or distasteful. But after a few trials, sometimes after a single trial, the chick will cease to peck at ladybirds. It has learnt one of the lessons of experience, and learnt it surely and rapidly. Some caterpillars are nice (from the chick's point of view); others are nasty. All alike are seized at first. Soon the nice ones are selected, the nasty ones rejected. Inherited tendencies lead the chick to peck at and seize any small things in response to visual stimuli; but experience gives the visual impressions meaning in terms of the results, pleasurable or the reverse, of the originally instinctive behaviour, which affords the opportunities of learning. The sight of a ladybird, or yellow-and-black cinnabar caterpillar, means unpleasant results; that of a small white maggot or brown looper caterpillar means satisfaction. In the former cases pecking is restrained; in the latter, it is carried out with added zest. We call the bird which can thus profit by its experience, intelligent. The instinctive response depends entirely on how the nervous mechanism has been built up through heredity; intelligent behaviour depends *also* on how the nervous mechanism has been modified and moulded by use during its development, and concurrently with the growth of individual experience in the customary situations of daily life. The intelligent act is a voluntary one, because it

depends on the individual choice of the experienced little bird.

But what is this experience but a further form of preparation for that kind of behaviour which I here call intelligent? The fact that a situation has meaning in terms of what previous behaviour has disclosed is an indication that the child or animal is prepared to deal with it in accordance with this meaning. But the preparation in this case is a matter of the child's own experience. A child who has learnt that a brown object which we call a stick of chocolate is nice, is prepared to apply his activities to the taking and munching of it. There are incoming nerve-currents, a disturbance of the lower brain-centres, and out-going nerve-currents. But the taking of the chocolate is probably dependent on some specific manner of preparation of the cortex concomitant with the previous experience.

Now in any case of intelligent behaviour dependent upon the preparation afforded by individual experience the presentative impressions are assimilated. That is implied when we say that sights and sounds acquire meaning for the child. The sight of his ball has meaning because he has already played with it in sundry ways. And when he is taken into a neighbour's nursery the sight of a different ball there is assimilated to his previous experience of such objects. In every case of intelligent behaviour initiated by sensory impressions within a given situation, we have a general formula which covers the facts of the case: Preparation; Presentation; Assimilation; Application. In all education which deals with practical experience there is preparation of such a kind that the presentations to the organs of sense may be so assimilated as to lead to the appropriate application of the mental and vital energies in some form of behaviour.

A distinguishing feature of intelligent guidance, due to individual preparation in the course of experience, is that it is selective in its nature. Now, in order to select, there must be material from which to select. This, so far as behaviour is concerned, is, at the outset of life, afforded by the great wealth and variety of the inherited modes of response. There is, to begin with, an over-production of movements, and from these the effective movements are selected, through the checking or inhibition of those which are redundant or ineffective. It is only gradually, for example, that the child learns to stretch out and grasp an object. At first the attempts are ineffective, notwithstanding the inherited grasping instinct when the fingers or the palm of the hand are stimulated. There is plenty of response, but much of it is ill-directed. Step by step, however, the surplusage of activity is inhibited; only the essential movements remain. Orderly adaptive behaviour is reached by the elimination of the non-adaptive redundancy. The same kind of thing is seen at a later stage of life. Years ago I taught country lads in a night school. When one of them was learning to write there was hardly a muscle in his body that was not at work. His foot was hooked round the leg of his chair; his shoulders were set and strained; his head was screwed on one side; his tongue thrust into his cheek. Over-production of active response was exemplified throughout his whole frame. Selection of the essentials is reached by the elimination of all this redundancy until only the business part of actual writing remains. That is part of the secret of skill. It looks so easy and so graceful just because all but the essentials have been got rid of. There was very much over-production to begin with. In most forms of awkwardness much remains; as may be seen on the cricket-field or the golf-links.

That is one mode in which intelligent selection is exercised. Now, take the proverbial case of the burnt child avoiding fire. He has learnt to reach out and grasp with the hand, and applies this kind of behaviour in order to get that alluring bright object. But his fingers are burnt. Seeing, reaching, grasping, and being hurt, constitute one bit of experience—one situation for consciousness, one disposition in consciousness. On a subsequent occasion the sight of that or a similar bright object revives the whole situation; but the situation was unpleasant; the disposition contains an impulse to aversion; and the stretching out and grasping is inhibited. Just how this is effected it is not easy to explain on physiological grounds; and no attempt at explanation will here be made; but such facts are familiar enough. The presentation to sight when a glowing ember is again seen is assimilated to the previous experience of the fire-situation. On the other hand, when the child sees a chocolate-drop, his impulse to grasp, take, and eat is not checked or inhibited. That is a quite different situation. Its development on previous occasions was eminently satisfactory, and the behaviour under these circumstances takes its place in the selected and not the rejected category.

It is unnecessary to exemplify further the way in which the child learns to deal selectively with the diverse situations of its daily life. Behaviour entails experience; and according as this experience is pleasant or the reverse, it tends in future to be repeated or to be held in check. Intelligent selective dispositions are formed. From our present point of view, what I wish to make clear is that every kind of behaviour is a form of application, and that it always presupposes a form of preparation. What the child inherits is one kind of preparation, which I have

termed racial; what the child acquires in the course of his own experience is a further kind of preparation, which may be termed individual. It is to this latter kind that the teacher can minister in various ways; but since it is so largely dependent on the natural capacities of the child, something further must be said on the child's hereditary dower.

First of all, as we have seen, the child inherits a capacity of behaving automatically and instinctively in certain ways when it gets the right kind of stimulus or presentation. Secondly, it inherits a capacity of feeling or experiencing both the presentation and the resulting behaviour. Thirdly, it inherits a capacity of being affected in other ways by the presentation. The heart-beat, respiration, circulation, may be increased or diminished; other internal organs may be affected, giving rise to organic impressions. Fourthly, it inherits a capacity of feeling or experiencing this also. Fifthly, it inherits sundry likings and dislikings, or the capacity of getting pleasure or satisfaction out of certain kinds of experience, and of feeling pain or discomfort from other kinds of experience. Sixthly, it inherits a capacity of assimilating new experience to old, and hence a capacity of mental development. Lastly, it inherits a capacity of profiting by experience; of inhibiting or checking certain forms of behaviour, leaving other forms to be carried out with increased nicety and vigour.

All of this inherited capacity is part of the child's natural dower. It is the outcome of racial preparation; it has been handed down as a legacy from the child's ancestors. But it will be said, this covers pretty nearly, if not quite, the whole field. All that the child does actually become, in the course of his physical and mental development, he has, through inheritance, the capacity of

becoming. That is so. But some of the behaviour is *wholly* due to racial preparation; the acts are performed before there is any experience; their performance affords what I called above the primordial tissue of experience. Other kinds of behaviour, those which we termed intelligent, are selected as the result or outcome of previous experience. They are not wholly due to racial preparation, but *also* partly due to individual preparation. That is what we mean by saying that the burnt child dreads fire. The boy inherits a capacity for riding a bicycle, otherwise he could never do so. But he has to learn to ride none the less. Individual experience is a condition without which the inherited capacity can not take effect. Training and education are the means by which children and older pupils are helped to obtain the individual preparation which is the necessary condition of effective application of the bodily and mental energies.

The varied forms of application are classified by psychologists under that aspect of the mental life which is distinguished as *conation*. The varied forms of presentation belong to the *cognitive* aspect. The varied forms of satisfaction and emotion fall under the *affective* aspect. These three are so closely related as to be practically inseparable, though one or other may carry the predominant emphasis. Let us consider how they are related.

We have then to inquire how what are termed in popular speech, knowing, feeling, and doing are related to each other. Let us, however, pause for a moment to remove some ambiguities which may arise out of the use of terms. The word "feeling" is used in three seemingly different senses. First, it may be used in a very wide and comprehensive sense for almost any mode of conscious experience; we feel hungry, depressed, uncomfortable, or

at ease; we feel the several kinds of impressions just in so far as they are presented in our experience; we have feelings of effort, striving, or endeavour. Secondly, we have the use of the word when it is restricted to impressions of touch; we feel the roughness of an object by applying to it our fingers; we feel for the box of matches on the mantelshelf in a dark room. Thirdly, we have the use implied in the distinction between knowing, feeling, and doing, the use which suggests the pleasurable or painful affective tone which gives colour to our experience. The context will generally show in which of these senses the word is used. Here we deal with such feelings as those of pleasure or of pain. But the word "pain" may also be ambiguous. It is employed, first, for some form of bodily injury or strain, when, for example, we speak of the pain of a bruise, a cut, or a toothache. Since there are probably special nerves and nerve-endings which are directly stimulated in such cases, pain, in this use of the word, is a sensation, and contributes to our impressions. Secondly, the word is used for a special quality of the affective tone or feeling. In this sense it is the antithesis of the diffused feeling of pleasure. Thus we speak of states of suspense or of anxiety as painful. It has been suggested that we should employ the term "displeasure," in a technical sense, as the antithesis of pleasure; but the ordinary implications of the word may thus lead to an ambiguity as great as that which we seek to avoid; and we may use the words "pain" and "painful" without much risk of being misunderstood, if we bear in mind that, thus employed, they do not necessarily imply any injury to the organs or tissues of the body.

Having made allowance for these ambiguities, two questions arise. First, granting that pleasure and pain are antithetical modes of affective tone which may accom-

pany any kind of experience, are there any other forms? What about the feeling of excitement, of which we are sometimes unable to say whether it is pleasurable or painful? It is no doubt partly due to somewhat indefinite organic impressions which come tingling in from various parts of our bodily organisation; it is accompanied by a toning up of the muscles. But it seems to carry with it emotional feeling. If so, is it a wholly different form of feeling, or is it a compound of pleasure and pain in such nicely-balanced proportion that neither preponderates? The discussion of this question would involve a close analysis, which would here be out of place. As a matter of direct experience, and for practical purposes, excitement, however constituted, does seem to have the same kind of reference to our personal feelings as pleasure and pain. Secondly, are there any really neutral states which are neither pleasurable nor painful, which involve no tinge of either excitement or depression, no trace of tension or relief—in a word, no accompaniment of that personal reference which seems to be a characteristic of feeling? The more speculative aspect of this question, too, we may disregard. It suffices for us to observe that what we notice is a change in the level of feeling either towards a more pleasurable or a more excited state, or in the opposite direction. Thus the same state of consciousness may be relatively pleasurable or painful in contrast with that which has preceded it. And if, as appears to be often the case, any noticeable change of level is absent, a uniform plane of affective tone being maintained, it seems to be neutral—not, however, from absence of feeling, but from absence of change of feeling.

Now it is a generally recognised fact that the state of feeling, whether of pleasure or pain, excitement or

depression, markedly influences the application of mental energy. Especially are upward changes, within due limits, conducive to satisfactory and effective doing. Assimilation is more vigorous; presentations have more serviceable meaning. A due preparation of the field of consciousness in its feeling aspect, the establishment of a full and rich affective tone, is a condition of efficient mental activity.

This opens up the further question with regard to the part played by this affective tone in furthering application—or, if the feeling be depressing and painful, hindering it. Feeling is commonly regarded by most of us as affording an affective link between knowing on the one hand and doing on the other. We say, for example, that the sight of an object evokes a feeling of interest, and that this leads to the application of attention to it, and then perhaps from added interest to active manipulation of the object for some specific purpose. Here, feeling seems to be a middle term between cognition on the one hand and the conation implied in active behaviour on the other hand. Even when some topic which we are studying, in itself evokes little or no interest, and is pursued for some ulterior aim, let us say for examinational purposes, even here, it may be urged that the pleasures of anticipated success, of conquering difficulties, of self-mastery, of overcoming the irksomeness of the task, afford the middle term leading to continued efforts to attain success. We are inclined to think, perhaps, that this account of the matter is somewhat strained, for after all the task is irksome; but shall we, can we, persist in it if the motives for its continuance are not in an adequate degree supplemented by feelings either of pleasure or of excitement? Exercise may either produce a pleasurable feeling of

exhilaration which leads to its continuance, or a painful feeling of fatigue which brings about its cessation. But towards the close of a long race the continuance of the exertion may cause distress, and yet we doggedly put forth our best endeavours. In this case it may be said that excitement supplies the middle term of feeling. A review of some of the common situations of our daily life will enable us to understand what is meant by those who say that, between the presentations to sense or to thought, and the resulting behaviour or conduct, practical or intellectual, some form of feeling always occupies the position of middle term. It is one thing, however, to say that affective tone is an accompaniment of or even a necessary condition to continued application; and another thing to contend that it is a sort of connecting link in which all the affective tone is concentrated, leaving the presentation and the application emotionally colourless.

Another way of putting the matter is this: What takes place in ordinary life-situations is a passage from an objective aspect in cognition, through a subjective aspect in feeling, to some change in the objective aspect through our own acts. Thus on seeing a picture hanging awry (knowing), we feel dissatisfied with its position (feeling) and set it straight (doing). A problem in geometry is presented to us (cognition); it arouses our interest (affective tone), and we apply ourselves to its solution, endeavouring to solve it (conation). We must, however, clearly understand the terms objective and subjective. Any bit of experience has what is sometimes termed a dual reference—an objective reference to that with which the experience deals; a subjective reference to the person who feels or has the experience. In a sense the problem of geometry as it stands is impersonal; there it is for you, me, or someone else to tackle;

it is independent of us severally. So, too, the solution of the problem; the result of our work when our end is achieved is in a sense, as it stands, impersonal; there it is for you or others to criticise it, admire it, or pick holes in it. But the interest I feel in it and its solution is personal. It is my own interest, and has reference to me as a subject, who feels the interest. What I have here spoken of as impersonal—that with which the experience deals—is objective. That which I have spoken of as personal—the affective tone of *my* experience of it—is subjective. It will perhaps be said that the understanding of the problem is also mine; mine, too, its solution. That is the very point to which I desire to lead up. *Any bit of experience is really one and indivisible*; it is a comprehensive unity. Only by analysis do we distinguish the objective reference from the subjective reference. Hence I spoke of cognition, affective tone, and conation as “aspects” of the mental life. And that is why it seems unsatisfactory to regard one of these aspects as a link between the other two. Is it not better to hold fast to the oneness of experience, and to say that in any piece of experience as a whole we may distinguish, though we cannot separate, an objective reference to that with which it deals, and a subjective reference to what it feels like to have the experience? It is in view of this latter reference that we speak of affective tone. Now this affective tone is such a personal and individual matter to each child, that the teacher cannot get at it directly. He can, however, help the child in the more impersonal knowing and doing in their objective aspect; and thus he can indirectly minister to the development of affective tone (interest and so forth)—just because of the oneness of experience.

There is one more characteristic feature about the feelings which must be noticed. After what has been said

above it will at first seem paradoxical. In naïve, natural, unsophisticated experience, and especially in its earlier and simpler phases of development, the feelings, important as they are as factors in the field of consciousness as a whole, lie for the most part in the background, and do not occupy the field of attention. Knowing and doing occupy the attention; feeling and affective tone are supplementary. When we are quite naturally interested in a topic, and feel a pleasurable excitement, we do not normally attend to the interest, pleasure, or excitement. We attend to the problem before us, and to the work we are doing upon it. We constantly tell the child to attend to what he is looking at, or what we are saying, or what he is doing; we do not urge him to attend to what he is feeling. This may seem paradoxical after what has been said above as to the personal reference of the affective tone; for to refer them to oneself as subject implies that we are attending to them. The point is, that we only attend to them in order to gain some knowledge of their nature *on reviewing our experience afterwards*; then we find that they were in the background of our consciousness in unsophisticated experience. But only when that experience is reviewed, analysed, and grouped in accordance with the dual reference, from the standpoint of systematic treatment, do we discover their essentially personal nature. Children, and indeed most of us, in the course of daily experience, do not distinguish self and not self. That only comes when we begin systematically to think about our experience.

Among the states of consciousness in which we find that the personal subjective reference was emphatic, when we come to review it and think about it reflectively, are the emotions. Certain presentations call them into being. These are generally cumulative, and arise out of the development of a situation. The disposition is also cumulative, and

its impulsive tendency grows in strength. There is thus a certain amount of preparation before the emotional state reaches a climax. The outcome is a remarkably vigorous and forcible application of the energies of behaviour. But there is something more to characterise the state of consciousness as emotional. There is a strong supplement of feeling, which may be pleasurable or painful, but is largely of the order of excitement. This is the accompaniment of a great number of peculiarly massive organic impressions, by no means easy to analyse. No doubt there is some divergency in the answers which may be given to the question: What is an emotion? Let me therefore at once say that in any state which I myself regard as emotional, whether it is due to uncanny sounds heard at dead of night, intense and absorbing interest, anger due to real or fancied injury, depression from failure or elation at success; when I am touched by pity, annoyed at stupidity, stirred by a great poem or picture, or moved by grand music; in all cases one of the characteristics is that my blood tingles, or my heart-stroke is affected, or my respiration altered, or queer sensations arise below the diaphragm. These vary, no doubt, in different cases; but unless I am conscious of one or more of these, there is not present what, as the outcome of my own experience and the use of terms I adopt, I should call an emotion. It may be said that these are the organic *effects* of the emotion, just as the expression in facial play, the clenched hands and set teeth of anger, the shrinking and crouching of fear, the limpness of depression, and the heightened muscular tone of elation (when one holds one's head high) are its effects on the motor system. But to separate them off as effects from the emotion itself as their cause, involves a subtle and somewhat questionable piece of analysis. Of the emotions actually felt, the diffused organic impressions and their affective tone seem to be

characteristic factors. To regard them as effects seems to leave the emotion itself tame and colourless.

Some psychologists, notably Professor Wm. James of Harvard and Professor C. Lange of Copenhagen, have gone so far in the opposite direction as to contend that the organic impressions and the active responses in behaviour are not only characteristic factors of an emotion but the *sole* factors. To a large extent the question turns on definition, and the emotions are hard to define. Of course if we say that they are not only characterised by the presence of certain reverberations throughout the bodily system, and certain specific modes of expression in behaviour, but that these are, by our definition, the sole constituents, there is an end of the matter. Other factors are by definition excluded. But if we regard an emotion as the subjective and affective aspect of a complex state of consciousness as a whole—a state of consciousness which has also objective reference to some person or thing which for cognition carries meaning and begets expectation—then the James-Lange view appears to be inadequate.

In any case, from our present standpoint the emotion is full of affective tone; often some form of excitement, pleasurable or painful perhaps, which is a condition of, or a preparation for, energetic and strenuous behaviour; sometimes some form of depression, when behaviour is inhibited, as in the state of collapse under extremity of fear. If we coolly reflect upon it, and analyse our states of consciousness when we *were* so angry, or so moved by pity, or so enthusiastic, we say that the affective tone, excitement or depression, pleasure or pain, is essentially subjective and personal in its reference. It is what we felt as characteristically emotional. But at the moment of experience it was felt as a palpitating background; it was

not then in the field of attention. The angry child is not thinking about his anger; the frightened child of his fear; the attention is mainly, if not wholly, occupied with the objective reference, the person to be struck or from whom the child shrinks. In other words, the attention is directed to the development of the situation in some definite way. That, at any rate, is the naïve, unsophisticated attitude. Of course there comes a stage at which the child does cast side glances of attention on its own feelings. But this is a product of reflection. The child is becoming self-conscious. Whether it occurs in child or adult, such partial attention to the subjective and personal aspect of the emotional state is a departure from the perfectly frank and natural mode of dealing with the situation. Suppose, for example, I am standing before a great picture, and am deeply touched and stirred by its beauty and power. The more my attention is fixed upon the picture itself and what it suggests, the more straightforward and unsophisticated is my appreciation of its æsthetic appeal. Directly I begin to analyse my own feelings I change my whole attitude. They may interest me, but it is a different interest. I am no longer so deeply touched when I am thinking about the character of my emotion. At the moment of strong emotion we are not introspective. The tide of feeling is at the back of our consciousness, not in the foreground.

Hence in dealing with the emotions of children the less we refer to them the better. To bring about a change in the emotional state we must seek to change the objective situation, to divert the attention from those presentations which minister to an angry or sullen disposition, and towards other presentations which shall minister to a happier and less unsocial frame of mind. The emotions of children and others are hard to influence directly; but

we can to some extent influence them indirectly, in so far as we can guide the attention-process.

How does the attention-process begin? If when an infant, say a month old, is staring vacantly, something bright be introduced into the field of vision on one side, the eyes will turn towards it. A strong (but not too strong) impression in the margin of the visual field is a stimulus which produces a response such that the impression is brought to the focus. This is an instinctive response. But it is on the lines of attention. It is the kind of raw material which the further developed attention-process incorporates. It is true that the behaviour is automatic, and depends on an inherited disposition. But if the child gains satisfaction by thus behaving, the successful responses will be selected and the child will begin to look round him with spontaneous attention; and, sooner or later, as experience widens, with the interest that attaches to meaning. The sight of things comes to mean that they can be grasped, and otherwise manipulated. More than the impression is in the field of attention. It may occupy the focus, but the way in which the situation may be developed lies round it in the field of the attention-process as a whole. By *spontaneous attention* we are to understand the conative aspect of a disposition which has also an affective aspect, generally tinged with pleasurable tone; and this we term interest.

As we have seen, spontaneous and intelligent attention implies the existence of those relationships which, for cognition, give the central impression some meaning or significance. Meaning for cognition (knowing), attention as a form of active conation (doing), and interest as affective tone (feeling), are only different aspects or modes of one and the same state of consciousness. The relationships involved depend upon the character and state of development of

the mind. They depend upon previous preparation. By carefully noting what a child attends to, in what he is interested, and what meaning it conveys to his understanding, we gain some insight into the kind and status of his mental quality. Attention is an expression of interest (so far as we can distinguish the two aspects), and interest implies that some meaning is conveyed. Hence it is said that interest is a form of self-expression.

With little children the teacher has to employ all possible means to foster such spontaneous interest and attention as naturally arise out of the topic in hand. Lessons and learning must be made as pleasant as possible. That is a condition of the attention being spontaneous. But those who contend that, throughout the course of education, this and this only is the kind of attention they should seek to develop are, I conceive, in error. There comes a stage when a more important thing than spontaneous attention is the will to attend. This is sometimes termed voluntary; but since the word is used with some variation of significance we will term it *volitional*. This implies an effort; it implies some *motive* for attending to this task, though it would be more pleasant to stray leisurely into that more alluring field of attention. This is the attention that has worth for the intellectual life, because of its significance for the development of systems of knowledge. This is the attention which betokens individuality and character. This is the attention which the teacher has to lead up to, along the pleasant avenue of spontaneous attention.

I cannot hope at present to make the distinction between spontaneous and volitional attention clear and convincing. It must suffice to say that the will to attend involves considerations stretching out beyond the immediate situation. That is implied by the term "motive." A motive

brings a particular situation into relation with a wider scheme of thought or conduct than is comprised within the immediate situation itself. Fortunately, continued application of the will renders further application more easy. This again falls into line with the doctrine of the importance of preparation. Which of us does not know by personal experience that it is the early stage of any new subject or fresh inquiry which demands a definite, and sometimes resolutely determined exercise of the will to attend? There *must* be some adequate motive; little satisfaction is gained in the performance of the task itself, but to do it has worth for the intellectual and moral life. In view of this worth, temptations to inattention (that is attention in other directions) must be inhibited. Sometimes we cannot inhibit them, do what we will. But here habit and facilitation come to our aid. As we make progress in our subject, or get into the swing of our inquiry, interest and the spontaneous type of attention increases. Why? Because the dispositions are becoming organised, because each new presented idea is brought into relation with a field which is larger and better prepared for its reception. More and more does volitional effort lapse; more and more pleasant and spontaneous is application; until at last, when we are thoroughly engrossed in our topic or inquiry, an effort is required to divert our attention. We cannot easily put the matter on one side, so strong is the disposition to continue along the lines which facilitation has rendered those of pleasurable and spontaneous flow of thought.

If it be asked in what way we can best foster volitional attention—make ourselves, for example, attend to an uninviting task, the answer is not easy to give. If, however, we remember that attention is a form of activity, that it is a mode of application, we may be led to find that the

best practical means to employ, is to do work on the subject. Most of us find that our attention wanders when we are "reading up" a topic. And many of us find that to return again, and again to the perusal of the text leaves us still incapable of fixing the attention. But if we set to work and write a brief digest of what has gone before, and then make notes of fresh points as we read, this definite application of our activities (rather than of our receptivities) affords the necessary facilitation—soon digest and notes may be laid aside. They have served their purpose.

One more feature of the attention-process may be noted. The more natural and normal and spontaneous it is, the less, as a process, does it come into the field of attention. Even in the case of volitional attention, to worry about the attention itself or the lack of it, is not the best means to secure our end; nay, rather it is one of the chief sources of distraction. We have to think about the end, proximate and remote, which is to be attained by and through the attention-process, rather than upon the process by and through which this end is to be attained. This is the means of preparation for effective mental application.

CHAPTER III

MEMORY AND ASSOCIATION

WE are all so familiar with some of the phenomena of memory, that at first sight it would seem quite easy to define the term and to assign the limits within which the memory-process occurs in our mental life. But it is by no means so easy as at first sight it appears. We have seen that the child comes into the world with an inherited disposition to grasp firmly with the hands if the palms be stimulated; and there are many such instinctive responses. Are these inherited dispositions cases of memory? Professor Hering says that they are. It is true that the behaviour is automatic. Still the nervous system and the tissues of the body retain the effects of what I have termed racial preparation. And such retention Professor Hering calls *organic memory*. If we are not prepared to accept this view, we are committed to the conclusion that physiological retention is not necessarily memory. We have also seen that as the result of experience the child learns to reach out and neatly pick up a small object; later on he may learn to ride a bicycle. On what are these acquired dispositions dependent? On the establishment and retention of physiological connections. Again, as the result of experience the child learns to avoid certain things, and to inhibit certain actions which have previously, under like circumstances, entailed unpleasant results. He has learnt,

too, that chocolate-drops, and ride-a-cock-horse on father's knee, are satisfactory, and has acquired a disposition so to behave as to renew such experiences. But on what do these dispositions depend? On the establishment and retention of physiological connections. But if we are committed to the conclusion that physiological retention is not necessarily memory, it is clear that it is at least open to us to say that the burnt child may avoid fire without remembering that he has scorched his fingers. And Professor Thorndike contends that simple perceptual behaviour need not, and probably does not, imply the presence of memory. It is not, after all, so easy to say what memory is. At any rate, for Professor Hering, who says that all organic retention is memory, and for Professor Thorndike, who contends that there may be much direct profiting by experience without any memory, the limits within which the word is used are very different.

Let us now look at the matter from another standpoint, and take one or two cases drawn from common and familiar experience, and considered in the light of our ordinary use of words. When we read a sentence or a paragraph we retain in mind near its close the net result of what has been said throughout. In ordinary phrase we are said to remember the preceding part. But are remembrance and such retention quite the same thing? Probably some of us would say, yes; others, no. Some would say, to retain in mind is to remember; of course this is memory. But others might urge that to remember is to recall to mind, to bring back into consciousness something which was previously there but has gone; something of which we have to be reminded. Cautious people might reply: the answer to such a query entirely depends on how we define memory and remembrance. And this is just the question we are considering. Take now a different case. We are

out for a walk with two children, and see a bird which they were told a few days ago was a starling. One of them at once remembers its name; the other does not. But does either of them have to remember that it is a bird? In familiar speech we should probably say that they know that it is a bird, but may or may not remember that it is a starling. The question is whether we are to include such immediate "knowledge" under memory—again a question of definition.

From these examples, first from the standpoint of scientific treatment, and next from that of popular usage, it seems clear that we must come to some definite understanding as to what we are to include within, and what we are to exclude from, the sphere of memory. First, let us agree to exclude purely instinctive phenomena due to racial preparation. Secondly, let us agree to include only those mental processes which involve re-presentation of what has been presented in previous individual experience. Thus we shall exclude retention within the field of consciousness of that which has not yet faded out of consciousness, as in the case of reading a paragraph.

It may be said, however, that if this be not memory it is none the less closely connected with the memory-process. Unquestionably it is. Let us therefore briefly consider its nature, applying to it the term *primary retention*. It may be well to take a concrete case. A child to-day is given by his nurse a spoonful of medicine; takes it readily; experiences its nasty taste, and turns away his head. This is one of the painful paragraphs in the book of life the child has to read. What are its sentences? First, the spoon in the focus of a field of consciousness, including also the nurse, the room, and so forth; secondly, the succeeding behaviour in taking the spoon and supping the medicine under the same (or practically the same) surrounding conditions;

thirdly, the nasty taste of the medicine, again under the same conditions; and lastly, the resulting behaviour of aversion — circumstances as before. These four stages occur so rapidly that the first has not faded from consciousness before the last comes to complete the developing situation—and to complete it with energy and emphasis. That is what it has all led up to. That is the impulsive climax of the paragraph. All four coalesce into one disposition, of which this is the final and crowning result.

• The constituent factors which thus unite to form one disposition are said to be *associated*. So far there is no memory, as we have agreed to define it. But what about to-morrow? The nurse comes, teaspoon in hand, repeating the pretty baby phrases, and takes the child in her lap. The beginning of the previous situation is presented under much the same circumstances. The disposition as a whole is reinstated; not necessary, however, the whole disposition in its successive details. The net results of all that horrid teaspoon business are suggested, and, since the child has not yet learnt self-restraint, the behaviour of aversion, that which was before the climax of the little life-paragraph, follows decisively and with emphasis. Here we have *memory as reinstatement*. Note that we have not the *seriatim* recapitulation of the steps by which the disposition was established. We have the coalescent net-results, with all the energy of behaviour drained off in the main channel of the original emphatic child-protest, more eloquent than words. Memory as reinstatement is probably never a complete recapitulation. Its value lies in getting the gist of the matter. And, paradoxical as it may sound, so far as there is time-reference at all, it is probably in such cases rather prospective than retrospective. It involves expectancy rather than reminiscence. The primary value of practical experience is to enable its

possessor to do the next thing that comes to hand, and to do it surely and effectively. The past conditions under which we learnt our lesson do not so much concern us. Perhaps, however, it is safest to say that reinstatement involves an indefinite fringe of pastness and a more definite fringe of expectancy. These are the germs from which the retrospection and anticipation of the later phases of the memory-process are developed.

The child, then, starts life with certain physiological dispositions to behave in hereditary instinctive ways. There are inherited nerve-connections, but not memory. The presentations and the application in behaviour are accompanied by consciousness, and, through primary retention, give rise to psychological dispositions. But the instinctive procedure opens up situations the development of which may be satisfactory or the reverse. The results of this development, with its consequent appetition or aversion, coalesce through the association of the constituent factors into selective or intelligent dispositions to avoid certain painful developments, and to repeat others which have afforded pleasure. These are called up by presentations which serve to reinstate the disposition as a whole, that is to say, the net-result of all that has become coalescent through association. Hour by hour and day by day in the child's early life fresh dispositions are acquired, and his intelligent behaviour increases in range and complexity. But how do the dispositions thus established persist? It is clear that they are in some way retained. And there can be little doubt that it is a physiological retention in the nervous system. Let us term this *secondary retention*. It seems to be a retention of the conditions under which the psychological disposition may be reinstated. An analogy may here be helpful. When we speak into a phonograph the effects of our voice are registered on

the cylinder of the instrument, and are thus retained in such a way that the tones can be reproduced at a subsequent time. The sounds themselves are not retained; but the conditions of their reproduction are established. This analogy may help us to understand the kind of way in which, though a psychological disposition, with its constituent impressions, cannot be retained as such in the brain, the conditions of its reproduction may be impressed on the brain tissue. If this be so there are two physiological pre-requisites of memory. First, some kind of registration of the connections established so as to link the disposition into a revivable whole (physiological association); and next, the secondary retention, without which there would be no such thing as mental development.

It is comparatively easy to understand the way in which an isolated disposition, such as that of the medicine situation, may be established, retained, and reinstated. It is much more difficult fully to grasp how the great number of overlapping and variously related dispositions gradually combine to form one consistent and unified body of experience. It is probable that this does not take place for some time. It is probable that reinstating memory in the child is developed at first in a number of isolated patches, with only slight connection. Only when the unification has reached a certain level do we begin to have one memory instead of a lot of independent memories. Perhaps the fact that for most of us there is no remembrance of anything that occurs before the age of from two to two and a half years, may justify us in supposing that the unification has not been carried far or rendered serviceable before that time. Be that as it may, our waking cradle hours and nursery days are mainly spent in weaving patches of that web which shall connect into one working tissue the data of the various senses.

Without the formation of association links the process of correlation of these data into effective dispositions could not take place, nor could such correlation be a guide to the further, fuller, and more accurate co-ordination of the muscular activities concerned in practical behaviour (*see* p. 96). In a word, without the connecting strands of association there would be no profiting by experience—nor indeed any experience by which to profit. Were the child to scald his tongue with hot porridge fifty times in succession, of what avail would it be to him if the sight of the steaming stuff did not reinstate the disposition which restrains him from eating it under these circumstances? And yet the child learns to wait and eat it when it is cooler. His growing experience enables him to adapt his behaviour to more subtle niceties of presentation.

And when we pass from the nursery into a larger world, with constantly widening horizon, the same kind of weaving, though that of a more intricate and complex web, always through direct and first-hand experience, is our constant guide. Not only are more dispositions formed; but they are more closely inter-related, and form a more unified body of experience. All our practical acquaintance with the nature of things, with their effects on each other and on ourselves, in their mutual actions and reactions, and in their relations to our instinctive or spontaneous behaviour, the lessons we have to learn as to what we can do and what is beyond our powers—all this is rendered serviceable to us through association. Now if the nature of our conscious life were such as always to present wholly new situations—no phase of experience occurring twice—this association linkage would be of no practical service or value; for there must be the presentative recurrence of some portion of the woven web

in order to afford the requisite conditions for the representative occurrence of the wider area of the network of which it has formed a part. Being what it is, however, practical experience presents again and again substantially the same situations in much the same order of sequence. And association secures that, when the beginning of one of these situations is so presented, the rest is representatively called up by the stirring of the brain processes which were the concomitants of the completion of analogous situations. If, for example, a child is brought into the study of his father, who is a smoker, he will see his father strike a match, will hear the "quick, sharp scratch," will see the spurt of flame, and will smell the tobacco's aroma. These will become associated. And when, on a subsequent occasion, the father takes up the box of matches all the rest of the developed situation will be suggested. And the represented completion will probably be reinforced by the actual and presentative completion. The repetition of the original series will strengthen the associations, and will render the revival in due sequence on a subsequent occasion more rapid and sure.

The correlative of association is *suggestion*. With the sight of the matches a definite situation has been associated in a given field of experience; and the subsequent sight of the box, held by the father in such and such a way, suggests the rest of the match-situation. The items of the original experience are to some extent presented in succession; but the re-presentation of the situation through suggestion may be relatively rapid, so as to appear simultaneous. They coalesce into one disposition. Nor need the original order be strictly preserved: the more salient features of the situation may, so to speak, outrun or outweigh the minor details. Thus re-presentation need not be, and seldom is, an exact copy of presentation. There is

much telescoping and omission of unimportant stages. The essential features for practical behaviour receive the greater emphasis: the non-essentials may lapse or merely lurk in the margin of consciousness.

We may take for granted, therefore, the great importance of association, and the suggestion it begets in the establishment of experience which is practically serviceable to the child. And it is a purely individual matter. Each of us has to weave the web of his own experience. But though associative connections are always individually acquired, it is none the less true that parents and teachers can afford aid and guidance. Our aim here is to give the infant or the child, or the developing boy or girl, opportunities for the acquisition of healthy, wholesome experience. The acquisition itself is the private concern of this or that child; all that we can do is to secure, so far as is possible, satisfactory conditions for the establishment of associations of the right sort. And this is a part of our ministration which requires tact and judgment. The world is full of objects which are in comparatively simple relationships with the child's activities. He soon finds out which of them, as unpleasant or hurtful, are to be avoided. We have little difficulty in furnishing the conditions for the gradual but sure acquisition of experience with regard to these objects. The only question is as to how far we should shield him from their unpleasant effects. We must not be too tender-hearted. The child who never has a chance of bruising his body or his sensitive nature against these objects will not be prepared to avoid contact with them when he is older. He will have to gain his experience of them some day; and not unfrequently it is for us to decide when that day shall come. Our task is more difficult when situations pleasant at the time beget habits which will

be harmful in the long-run; guidance here requires more tact; and it is all the more essential since it marks out the lines for future volitional control in the more highly evolved moral conduct.

We shall have to return to association presently. We have regarded it as the linkage which is established within a disposition. Since the various items thus linked together lie side by side within the unity whole of a disposition, it is termed *association by contiguity*. This is probably the one and only type of association. The correlative of association is *suggestion*. All that has been associated within a coalescent disposition, or at any rate the net results which have value for experience, are called up or suggested by the initial phases, or some other part of a situation which is similar to that which called the disposition into being. This is *suggestion by similars*.

Memory by simple reinstatement need not involve any definite recognition with retrospective reference to the circumstances of the original development of what I have termed the mental disposition, though there may be what I spoke of as a fringe of pastness, a dim awareness of the former occurrence. This, however, is characteristic of much of that process to which most of us apply the term *memory*; indeed the term is restricted to this kind of remembering by some psychologists — by Professor Thorndike, for example. Walking down the street, I see a man, and have at first a feeling of indefinite recognition. I've met him before; but when and where escapes me. There is not much more than the dim awareness of some previous situation of my past experience in which he has somehow played a part. But it may become more. I look at him again more closely when we pass; and as I continue my walk keep the image of his face before me. Gradually, or perhaps suddenly, it becomes the

nucleus of a memory picture. The man beneath it is clothed in a frock-coat; there is a clergyman standing near, robed; chancel steps, bride and bridegroom — of course, I have it. He was best-man at So-and-so's wedding. Quite definitely I should now say that I remember or recollect the fact, and recognise the man. This is a case of memory with retrospective reference. Suppose, however, that as I proceed farther down the street I meet my old friend Brown. I don't have to recollect that it is Brown. I recognise him at once, and greet him with the usual nod. The case is analogous to that of the child who knows a bird when he sees one. Is there retrospective reference here? Not to any particular situation, as in the case of the wedding in which the best-man figured. Still it is there. If you asked me when and where I met that man, I should reply: "What, Brown? Why, I see him every week, and have done so for years! We cycle out to the golf-links together; play bridge at each other's house,—we are sometimes spoken of as the inseparables." The retrospective reference is indefinite just because there is so much of it. The fringe of pastness is a fringe of perfect familiarity. The difficult thing to remember or recollect is when we *first* met Brown. But we do remember the occasion when a few kindly words made us realise what a good fellow he was—one worth knowing better.

Now without going so far as to assert that memory with definite retrospective reference is confined to ideational process, we may at least say that it is only when one's past experience has taken systematic form as an orderly sequence of events—a bit of our own history—that one can clearly and decisively place an event or the recognition of a person. But there is another way of placing—in a system of knowledge, independent of time and space.

Suppose a boy is reading over a geometry paper. This question has a mere indefinite fringe of pastness. The boy feels that he has come across this during the term—that is all. But his neighbour, after a little thought, may be able to place it accurately in a geometrical scheme. He met it in Euclid's First Book, Prop. 15 (or some other system of geometry), and both greet with perfect familiarity such terms as "angle," "base," "parallel" when they meet the eye. They are old friends (or enemies!). The boys may not pause to define them. But they feel (let us hope) that they could define them if they were required to do so.

We thus see that memory with retrospective reference passes from an initial indefinite stage—have met the thing in past experience goodness knows when or where—through a definite stage of explicit placing (and it is here that the words "remember" and "recollect" find their common use), to a final stage of indefiniteness from sheer familiarity. We are sufficiently well acquainted with the first in our pupils (it is probably not unknown in ourselves); our aim should be to lead up through the second to the third.

Just as attention may be either spontaneous or volitional, so too in the case of memory. The appropriate relational setting of any event or fact may either come to mind or it may be brought to mind with some effort. It is convenient to employ the term *remembrance* for the natural and spontaneous coming to mind in their appropriate setting of images or ideas; and the term *recollection* for the process of, so to speak, hunting up the appropriate setting through the application of volitional activity. In this terminology we should speak of "trying to recollect," but not of "trying to remember," since remembrance comes of itself without effort of will. But the distinction, though convenient, is not preserved in popular speech

There is much discussion of the question how far the memory is susceptible of improvement. It is probable, but not certain, that retentiveness, upon which both remembering and recollecting ultimately depend, is a physiological datum, something given in the quality of the brain-substance, something which we can no more alter than we can change the size of our skulls, or, to take what is perhaps a closer analogy, the size of our muscles. By careful use and training we may develop our muscles within the limits assigned by nature. So, too, by careful exercise we may perhaps develop retentiveness in ourselves and our pupils within the limits assigned to it by nature. But the limits are probably narrow—narrower than in the case of muscular development. Be this as it may, there is no question that the art of recollection can be cultivated, and is susceptible of much improvement. If what is sometimes called the casual memory is a natural gift,—the systematic application of memory is an acquired art, and an art that is eminently serviceable in daily life and in framing a system of knowledge. A tenacious memory (say for dates) may be, and sometimes is, a snare—if it be allowed to take the place of, instead of contributing to, a systematic bringing of events into relationship and a rational comprehension of their significance. For example, I ask a boy who can readily learn a lot of dates, when Jonson's *Every Man in his Humour* was published. He answers glibly, "1596." I say: "Was Shakespeare still living?" He looks confused. And I continue: "Was Cromwell dead?" to his still greater confusion. And yet he can give me pat, if directly asked, the dates of Shakespeare's death and of Cromwell's Protectorate. He does not think, but trusts to parrot-like association. He has materials for historical time reference; but he cannot utilise them rationally and

systematically. Another boy, of whom the same question concerning Jonson's comedy is asked, may reply: "I do not remember the exact date, though I have seen it stated. But it was after the publication of the *Faerie Queen* and before Bacon's *Essays* appeared. I happen to remember these dates; so *Every Man in his Humour* must have been produced between 1590 and 1597." His answer is less exact; but it is more rational, and from the point of view of systematic knowledge of greater value.

This is the kind of memory we can do much to improve by sound educational methods. It is of value in daily life, and its skilful employment marks the educated man, and it is essential to systematic progress in all fields of intellectual thought. Let me exemplify. A few days ago I chanced to come across an old faded photograph of a canoe. Instantly there flashed across my mind a vivid memory picture. There was absolutely no effort. It was a case of remembrance. The body of a dead man floated in the Thames. I saw, and see again now, the bow of my canoe in the immediate foreground, the dark-brown hair stirred by the water's flow, the dimmer outline of the body, feet down-stream, the reeds near the bank to my left, a boat with two watermen rowing towards the corpse from the right, and many other details which I need not set down. And though I do not, of course, picture myself, I distinctly feel myself there in view of all this, and feel myself as a young man. The whole is so vivid that it might be actually before me, were it not for the fact that as I recall it there are the presentative elements of my present situation. I am not in a canoe, but in my chair at my study-table, my manuscript before me, a lamp to my left, and so forth; and I feel myself also as I am now, no longer a youth. Although these presentative impressions are in the field of consciousness, they are not (or were not)

in the field of attention till I began to set them down in writing. It is in large degree this discrepancy between the presentative now-situation and the re-presentative then-situation, both of which are in the field of consciousness, linked in the field of attention by my now writing concerning what has then-reference, that differentiates the remembered scene, and marks the memory-process. Should I dream the scene to-night, the presentative background being lacking, it would seem to be actually here and now—or more strictly, time-reference would lapse.

But clearly as I remember the scene on the river, I have to recollect when it occurred. As a matter of fact a quarter of an hour before I wrote this paragraph I could not have said exactly when the occurrence was. I had to hunt up other memories to give the requisite clues. How do I proceed? In the first place I can recollect when I bought and when I sold the canoe. That limits the range of time-reference to a span of about four years. In the second place I remember that it was a great relief to see those watermen row up, for I was going to Switzerland in a few days with my brother, and if no one else had seen the body, it would have been my duty to lodge information of the matter, and this might have delayed our start. But I went to Switzerland four years in succession at that period of my life, only two of which, however, overlapped with my possession of the canoe. This further limits the time-span within which the incident may have occurred, to two years. On searching for a further clue I recollect reading on the same afternoon, while I lunched, a note-book on mineralogy in view of my Swiss tour. That finally fixes the time as the summer of 1873; for in the other possible year, 1872, glacial action occupied my chief attention.

I have dealt with this incident at some length because

it exemplifies the method of systematic recollection. I have from time to time taken some pains to learn how to run such events down, and get at their place in the scheme of my past experience. I am of opinion that it is of educational and social value to teach such methods—I do not mean in set classroom work but incidentally. Boys and girls find it quite as interesting as much of their set work, and it may be of real value. For any one of us at any time may be summoned as a witness; and to be a good witness may be of great social importance.

As in the establishment of skill, there is subconscious inhibition of over-produced extraneous motor activities, having only the essential co-ordination necessary for the nicely adapted behaviour. So, too, in purposeful recollection there is a conscious and volitional repression of extraneous suggestion, unnecessary for the end in view, and diverting the attention. How difficult it is to keep uneducated persons to the point. You visit a country village, and, seeing a mural tablet in the church in memory of the Rev. Henry Williams, wish to know whether he was the author of that interesting little book on the customs of the Maoris in your father's library. You seek for information from the old sexton. "Why, you do mean old Parson Williams who was here when I was a lad. I was working then for the squire; a good master to me he was" (here follow sundry personal reminiscences). You recall his attention to the parson. "Oh yes! I remember him. He came and sat with me when I broke my leg" (the nature of the accident fully described). "He was kind, sure enough. Not kinder than the doctor, though. Why, the doctor he comes in and he says, cheery-like" (here follows much concerning the good doctor). Again you bring him back to the Rev. Henry Williams. "Remember him; why, of course I do. He was a preacher; but always from the book. Very differ-

ent, sir, from the present vicar. He thumps the cushion and says it all out of his head" (here follows much about the present vicar). You lead him back into the track. "Had Mr. Williams been in foreign parts? Maybe he had. The old squire, now, he'd been all over the world. And the stories he could tell. When I lay abed after that accident he come in one day and he says to me, says he" (here follow some of the squire's traveller's tales). "What did Parson Williams talk about when he come in? Oh, I can't rightly say. Bible stuff, mostly, and kindly meant. But I do mind he told me one day how the black fellows in New Zealand"— At last you have the clue you sought. But only after following the old sexton along many and devious paths of personal reminiscence, of which the above is only a condensed epitome. I have here introduced an example of what is sufficiently familiar, because it serves to illustrate the normal course of the flow of remembrance when it is not under the control of a definite volitional purpose; and because it serves to re-introduce the subject of suggestion as dependent on preformed association.

First, a few words by way of reminder. Near the outset of the first chapter attention was drawn to the fact that as we look around us in the course of daily experience we have at any moment a field of vision grouped around a central point or focus, and that in succeeding moments there is a successive regrouping around new visual centres. Extending the analogy we spoke of the field of consciousness grouped around the centre of attention. This field of consciousness comprises both presentative and re-presentative factors, and owing to previous experience any given object of cognition may have meaning or significance attaching to it. In the succeeding chapter we learnt that there is around and closely connected with that which is in the focus of consciousness, a field of attention set

in a surrounding field of non-attention. In this chapter we have seen how through primary retention an isolated disposition may be formed; and I drew attention to the fact that the complexity of the mental life is largely due to the overlap and interaction of many dispositions. We have now to try to bring these several points of view into relation, so as to interpret the flow of consciousness in remembrance and in recollection.

If after calling upon a friend for an hour's chat you take the trouble to note down the course of your conversation, you will probably find that it has ranged over many topics. You begin by discussing some recent speech dealing forcibly with questions of fiscal policy, you end with old silver spoons. How did you get from one to the other? It will be convenient to adopt the logical phrase "universe of discourse" for each successive field of attention as the conversation proceeds. And it will be unnecessary to give more than a few salient steps in the regrouping around new centres of attention. To start with, fiscal problems are the focus of a political universe of discourse. But home-rule lurks in the margin. Soon this becomes the centre of a rearrangement, and Gladstone comes to the edge of the field and soon becomes the focus. The universe is changing. Morley's "Life" hovers around. I happen to have been in South Africa when a certain action of Gladstone's, in my opinion, sowed the seed from which the Boer War grew. This tingles in the margin, and soon leaps to the focus. After a wholesome disagreement as to Gladstone's share in the matter, the war itself becomes the universe of discourse. This leads me to describe a monster "side show" on the war at the St. Louis Exposition. America becomes the universe of discourse, with the Boer War still hovering around. Further details are needless. American sympathy with Japan in

its late war, leads to a Japanese universe, this to that of their ceramic products, this in turn to Dresden china, this to a mutual friend's fine collection, and this at last to his other hobby, old silver, and especially spoons! In every case the new centre is first introduced as a marginal element in the preceding universe, but becomes a new centre of rearrangement. Each step depends on a previous preparation, and the association of factors in a mental disposition. Interest rules throughout as the affective tone attaching to the relationships in our thought. Every stage of suggestion depends upon some previous association by contiguity, though it may have other and perhaps more important implications. And it is always suggestion within the given universe. It is what it is under the conditioning relationships of the field of attention and of non-attention.

We can perhaps conceive a very simple type of primitive experience, in which each several impression has been associated with others within a single disposition, and one only. That is not our adult experience, nor even that of a young child. It is inevitable that as soon as the life-relations become at all complex, as they must do, seeing that we have to deal with a number of situations, and possess only one set of sense organs and one brain wherewith to tackle them, what we call the same impression must occur again and again in various settings, must play its part in many dispositions, and must have different associates in any one of them from what it has in the others. I have incidentally illustrated this (p. 25) in a slightly different connection, with regard to water, the sight of which under one set of conditions suggests one disposition (say to drink it), and under another set of conditions a different use (say to wash in it). So, too, with our words. The sound of the word "cat" has been

associated with the sight of the animal, with the sight of the word, as printed, with the pronunciation of the word, with the drawing of the animal, with the writing of the word. The mental disposition of the moment, the setting of the sound impression, will determine which group of associates shall be called up at the suggestion of the word. Under the conditions of repeating what the teacher reads, the pronunciation of the word is suggested; under the conditions of dictation, the writing of the word; under the conditions of a walk in the garden there will be an expectation of seeing a cat; and so forth.

It should be noted that each of these several dispositions, in connection with which the sound of the word has a different meaning for behaviour, is a further illustration of that preparation we considered in the last chapter. Suppose someone asks you what you understand by the word "box." Fired point-blank at you the word may be meaningless, just because it has so many meanings—a paint-box, a hat-box, a box at the opera, the coachman's box, a box on the ear, a Christmas box, and so forth. The question is a ridiculous one; and no question should be put a child in such an empty form. But suppose someone says: Sauntering along the well-kept gravel walk, I admired the low, neatly-trimmed edging of box: what do you understand by the word "box"? Here the word is given in a definite setting, and the preparation of the previous part of the sentence in which it occurs should enable it to suggest an appropriate meaning. And there is an inhibition of other extraneous meanings—extraneous under the conditions of the sentence.

Now in any free and untrammelled conversation, and in any reverie there are great numbers of extraneous suggestions. But unless one is to be a hopeless bore, most of them are inhibited, and what is specially inhibited will partly

depend on one's company, partly on the relation of one's own knowledge to that of one's companion, partly on one's total disposition. Perchance I know a little of geology; if so, I may either repress a disposition to touch upon the subject in talking to Smith, who knows less than I do, for fear of wearying him; or I may give rein to my disposition so as to make a parade of what little I know. On the other hand, while with Robinson, who is on the Geological Survey, I may avoid the subject lest I betray the scantiness of my knowledge; or I may court it so that I may learn more. The conditions under which one's talk, as an index of one's thought, is either allowed to flow freely along the channels opened up by suggestion or is inhibited, are many and varied. But in the last resort they are an expression of one's personality, one's character, the net result of thousands of preformed dispositions.

Now systematic recollection as a means to intellectual progress involves much volitional inhibition—much repression of extraneous suggestion. It involves the restriction of the memory-process to a single definite universe of discourse undergoing purposeful development to a definite end. This is just what is so hard for boys and girls. It can only be attained by a gradual process of facilitation as the outcome of steady application and the formation of intellectual and rational dispositions. In daily life and in the pages of fiction (for example in Jane Austen's inimitable *Miss Bates*) we meet with examples of the antithesis of this purposeful restriction of thought within a given universe. There is a gay and irresponsible skipping from universe to universe, half a dozen being danced through in a breath. Take for illustration the following quite apocryphal extract from a schoolgirl's letter: "Yesterday I walked by the pond, and found it, oh, so hot even for July. We skated there together last year.

It was just like flying through the air. I can conceive nothing more joyous than a bird's life. Is it not sad that the poor soft things should be plucked to stuff a feather-bed? But for myself I prefer a mattress. I sleep better, and there is nothing more invigorating than sound sleep. It gives an edge to one's appetite for breakfast. We always have porridge here, which reminds me of our delightful holiday in Scotland—the land of Burns and Walter Scott. I think the mountains far grander than those of Cumberland, which were the inspiration of Wordsworth. I have been reading some of his poetry, but *much* prefer Tennyson. Arthur is so delightfully mythical. I can't understand anyone preferring Browning; and as to George Meredith's poetry, well, my dear, it's quite beyond me; though there are chapters in *Evan Harrington* and *The Egoist* which are *most* racy," and so on.

I give this as an example of the irresponsible play of remembrance along lines of suggestion which arise spontaneously. There is little attempt at inhibition. For the purpose in hand, that of chatting on paper to her school friend, there is no call for inhibition. But it is not impossible that the same girl, sitting before an examination paper, might, by strenuous effort of will, recollect a long and difficult argument. If so, all these rapid transitions from universe to universe must be checked. Every suggestion which does not tend to the development of the answer and the recall of the stages of proof must be suppressed. Clearer now, perhaps, will be the significance of what I said above. Just as skilled acts are reached by the inhibition of all extraneous bodily movements, so are the higher forms of mental application reached by the inhibition of all that is extraneous in the movement of thought along the lines opened out by suggestion. Both are selective, skill as such by a subconscious process mainly

perceptual; thought as such by a more deliberately conscious process, wholly ideational. For both it is essential that there should be material from which to select; in skill, an over-production of movements of the bodily organs; in thought, a rich and varied suggestiveness. And both are ultimately dependent on the establishment of associations within a growing disposition; in skill, the association between a presentation and the requisite response in action selected on the grounds of its success; in thought—well, let us consider the part played by association in ideational process.

I described association as the establishment of connections between the constituent factors of a single disposition. Since, in a sense, they lie side by side within the field of primary retention, they are associations by contiguity. Take once more the simple case of an acquired disposition to take and eat chocolate. Several factors have been connected, and owing to their associative connection, the sight of a chocolate-drop suggests the disposition as a whole, revives the previous situation. Since the chocolate-drop is not the same brown object which the child ate yesterday, but a similar one, this may be called suggestion by similars. I think it may be said that *all* association is by contiguity, and that *all* suggestion is by similars, for we never have the same presentation twice, though it may on the second occasion be another presentation from what we call the same source. We must remember that what is presented to consciousness is a situation as a whole, and this is seldom quite the same on two occasions; for practical behaviour, however, it must be sufficiently similar on subsequent occasions to reinstate a like disposition with its attendant response to the situation.

But as experience develops and becomes more complex

the same factor (we may call it the same for practical purposes) occurs in different situations. When a factor is thus common to two diverse situations, its recurrence in one may reinstate the other. When I see in the street the man who was prominent in his frock-coat at So-and-so's wedding, he is a common factor in this street-situation and in that church-situation. He *was* associated by contiguity in that; he *is* associated by contiguity in this. The revival of the past scene is again a suggestion by similars. The man's face in different settings is the common factor. If the teacher will pause to consider, he will readily realise how much of his work involves this kind of suggestion.

Now the process of comparison which lies at the very foundations of the ideational life is primarily an emphasis on some factor common to many situations. Part, and for our social life an essential part, of the resultant disposition is to name it. The process is repeated again and again under varying circumstances, until this common factor (let us say weight or hardness) grows familiar, like the appearance of our old friend Brown. It has been a factor in so many situations, that it no longer tends to revive any one in particular. But it is the result of comparison. And another part, and again an essential part for further ideational progress, of the resultant disposition, is a disposition to compare. This involves a concentration of attention on the factors that do matter for the purpose in hand, and a relative disregard of the factors that do not matter. And new kinds of association are formed. When the child is comparing colours, not only those which resemble each other but those which differ from one another, coalesce in one cumulative disposition to recognise similarity and difference. Both are present to consciousness in the moment of primary retention; they lie side by side

in one field of now-experience; they are associated by contiguity. Ideas of similarity and dissimilarity are distinguished and named. When once a disposition to compare is formed, each several factor tends to suggest its likes against a background of unlikes, its unlikes against a background of likes. It is a common factor—a “similar” of suggestive value.

As the mental life grows richer and more complex, more subtle relationships are disclosed in a more decisively intellectual comparison. In the early stages of experience, suggestion by similars is dependent upon mere superficial resemblance. In later stages there is a suggestion by similarity in more deep-seated characters. It is probably impossible to draw any hard-and-fast distinction. But we may perhaps say that suggestion by resemblance *need not* involve any recognition of the similarity. In memory, by simple reinstatement such recognition of similarity is probably absent. We have in such cases suggestion by similars, but not necessarily the recognition of similars.

In teaching a child, we are constantly indicating differences and distinctions, as well as similarities and resemblances. We teach him to group things together in virtue of their general resemblances, and to distinguish within the group in virtue of particular differences. This buttercup is different from that daisy, but both are flowers; this dog is different from that cat, but both are animals; Mabel is different from Lucy, but both are girls; and so on in a great number of cases. This constant habit of comparing things begets a tendency in a quick-witted child to be on the look-out not only for resemblance, but also for contrast. And as this habit becomes more and more established with passing years and growing experience, there is an increasing tendency for things to suggest not only their likes but their opposites. To suggestion by resemblance is added

suggestion by contrast. And when such contrasts have been suggested, they become associated by contiguity, and the subsequent suggestion is thus reinforced. The language of description constantly uses resemblance and contrast side by side, the one to enforce the other. The wing of the penguin, we say, is like the flipper of the seal, and very different from the wing of a swift or a seagull. The sea looked dull and gloomy, there was no life or brightness in the scene. *A.* is slow, sure, and industrious, and quite unlike the brilliant but terribly idle *Z.* And so in a number of other similar cases, which will readily suggest themselves.

The language of the poet is full of suggestions by resemblance, similarity, and contrast. I will illustrate this by a few examples from Tennyson. Resemblance prompts such lines as

"A brow
May-blossom, and a cheek of apple-blossom."

"And her hair
In gloss and hue the chestnut, when the shell
Divides threefold to show the fruit within."

But it is similarity of relations which is suggestive in

"A rosebud set with little wifal thorns,
And sweet as English air could make her."

There is more of similarity than resemblance in

"A laugh,
Ringing like proven golden coinage true."

So, too, in the question:

"Was he not
A full-cell'd honeycomb of eloquence,
Stored from all flowers?"



The alternating cloud and sunshine of April suggest the comparison of the lines :

“And hopes and light regrets that come,
Make April of her tender eyes.”

A somewhat similar thought occurs again in

“So sweetly gleam'd her eyes behind her tears,
Like sunlight on the plain behind a shower.”

One or two more examples of analogies drawn from Nature must suffice.

“A doubtful throne is ice in summer seas.”

This simile was no doubt suggested by the instability of the equilibrium of an iceberg melting in a warm current. The suggestiveness of flowers was always great and varied for Tennyson.

“Wearing the white flower of a blameless life.”

“Wait, and Love himself will bring
The drooping flower of knowledge changed to fruit
Of wisdom.”

My last example of such suggestions by similarity is a rather more complex one, in which an analogy is drawn between the forging of metal and the forging of character. It occurs in *In Memoriam*—

“Life is not as idle ore,
But iron dug from central gloom,
And heated hot with burning fears,
And dipt in baths of hissing tears,
And batter'd with the shocks of doom
To shape and use.”

By the man of science, as by the poet, suggestion by similarity, with occasional illustrative contrast, is constantly used in description and in explanation. The moon, we

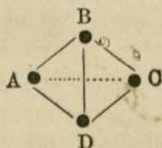
say, is continually falling towards the earth, as a stone falls towards the ground ; or, the moon swings round the earth as a ball at the end of a string swings round your hand. Just as the straight-falling raindrops seem to be slanting to a man who is driving rapidly in a dogcart, so do the rays of light from distant stars seem to change their direction as the earth whirls round in her orbital course. Just as the artificial selection of the gardener tends to the preservation of the strongest and most beautiful plants, so does the destruction of the weakly and imperfect, in the natural struggle for existence among organisms, tend to the survival of the strongest and healthiest. Just as, to give one more example, pressure will squeeze ice into the condition of water, because water *expands* on freezing, so will pressure squeeze molten rock into the solid condition, because molten rock *contracts* on solidifying. This last example shows how a fairly simple process of reasoning is based on an insight into inverse similarity of relations.

We seem to have travelled a long distance from our foundations in association by contiguity, and the simpler forms of suggestion by similars. And yet there is probably not an original thought which is not proximately or ultimately dependent on such association and such suggestion. Let us consider a particular case, for example Tennyson's line :

"A doubtful throne is ice in summer seas."

There is nothing in a doubtful throne to lead directly to the suggestion of an iceberg. The two had perhaps never before been associated within one thought-disposition. The connections are indirect. There must be some mediating factor. The doubtful throne is unstable. Instability becomes the centre of thought. But there are

many examples of instability, such as inverted pyramids, unskilled skaters, and among others, icebergs which occasionally "turn turtle." Instability thus is a mediating factor between doubtful throne and other things, including icebergs. But why is the iceberg selected from among other examples? Because the instability of the iceberg is due to the undermining of warm water, and the instability of the throne is likewise due to undermining by the waters of disaffection. We have a second mediating factor in the sapping of foundations. That secures the selection of iceberg from other examples. In the diagram below, A is the doubtful throne implying, as doubtful, B, instability. A and B have already been associated in thought. But B has also been associated with C, the doubtful iceberg. A and C are now factors within one disposition, and are thus for the first time associated. Furthermore, the instability, B, which is



common to both A and C, is associated with undermining, D. This clinches the connection between A and C. It only remains for the poet as artist to express his thought with delicate suggestiveness. There is no elaborate unfolding of the thought. It suffices to say that "A doubtful throne is ice in summer seas." We are left to perceive the congruity between the universe of doubtful throne and that of ice in summer seas. A good pun suddenly shunts our thought into a new universe; but to be a really good one there must be a congruous incongruity in the relation of the two universes. We

come back to the old thought with a smile or a laugh. At the close of one of Huxley's lectures a group of students were discussing difficulties. "I cannot understand it," exclaimed an able Frenchman. "Never mind, old fellow," said a feather-head, "we're all rowing in the same boat." "But, thank the Lord," was the prompt reply, "not with the same *sculls*." Note here the subtle interaction between the two universes.

Not only may a fresh simile or metaphor or a brilliant pun arise out of the bringing into relation of diverse but in some way congruous universes of discourse, a new hypothesis may thus be suggested. Charles Darwin and Dr. Alfred Russell Wallace both reached the conception of Natural Selection on reading Malthus's work on Population. Both had acquired a system of knowledge concerning the relationships of animals and plants. In both the net results were constantly in mind. As they ranged in thought over the system, now one and now another factor was in the focus of attention, with a rearrangement of the other factors around it. They read Malthus. Unless some factor in the Malthusian universe of discourse coincided or was congruous with some factor in the universe of biological thought, the two could not come into fruitful relation. But there was a mediating factor common to both—over-production of offspring. There were other features sufficiently congruent to enable the Malthusian discussion to throw light on the problems of biology. Hence arose the suggestion, through the mediation of previous associations, of Natural Selection through the elimination of the unfit. New suggestions always arise within the area of intersection of different but allied universes, containing a factor or factors common to both.

Much confusion has unfortunately arisen from the

employment of the word "association," both for the establishment of connections and for the suggestion which results. Assuming that the simile in Shelley's lines—

"Drive my dead thoughts over the universe
Like withered leaves to quicken a new birth,"

was for him an original thought, then it may well be asked: How can this be a case of association, since the two constituent factors of the simile never occurred together before? These constituent factors are "dead thoughts" and "withered leaves." The bringing of them into relationship is wholly new. But the universe of "dead thoughts" and the universe of "withered leaves" have a common factor—they form a fertile soil on the one hand for new thoughts, and on the other hand for fresh vegetation. This is the point of contact necessary for any suggestion by similars. The facts, then, are these. A quickening fertility *has been* associated with last year's thoughts and last year's leaves. It is the "similar" through the intervention of which the one suggests the other. Only *after* suggestion can we say that the two—dead thoughts and withered leaves—have been associated. And how associated? By contiguity. By their joint occupancy of the same intellectual outlook in a moment of primary retention.

The gist of the whole matter is this. Memory works through suggestion; the one principle of suggestion is that which has been termed suggestion by similars. This suggestion is always directly or indirectly, immediately or mediately, dependent on previous association. The one principle of association is that by contiguity—the co-existence of diverse factors in one disposition, one situation, one system of thought, one outlook at the moment of primary retention. Every new and original

thought, and all mental initiative, are dependent on memory. But only when memory becomes the handmaid of the higher mental processes concerned in synthesis and construction; do we find the illuminating suggestions of the artist, the poet, or the man of science.

A distinction was drawn a few pages back between suggestion by similars and recognition of similars. The former has primarily a prospective reference; the latter has often a retrospective reference, and always involves some element of deliberate comparison. On opening my front door as I leave the house I notice the lowering state of the sky, and take my umbrella from the stand. This behaviour is the outcome of suggestion by similars. Such action has been frequently associated with such an appearance of the sky. I think no more about the matter. But suppose I pause and say to my wife, "Does not this threatening sky to-day remind you of the cloud-effect we noticed last Sunday?" Then there is recognition of similars. This sky-scape is compared with a previous experience, and pronounced to be similar. There is retrospective reference. There is not merely a suggestion of appropriate behaviour; there is a deliberate judgment concerning the similarity, and a recall of that cloud-effect, which is compared with this and said to be of like nature.

CHAPTER IV

PRACTICAL EXPERIENCE

A DISTINCTION between naïve, practical experience and a system of knowledge has already been very briefly indicated. The teacher in the course of his work is ministering to the development of both, and of each in close touch with the other. But though, in beings who are both intelligent and rational, there is continual interaction between the one and the other, it is well to distinguish them, so as to understand the nature of the interaction. By practical experience we are to understand that which is immediately and directly of guiding value in a particular and concrete situation. Thus when a child sees a flower it means for his practical experience something which he can pluck, smell, place in a vase, and so on. For such behaviour towards it he need not have any systematic knowledge. He just assimilates the visual impression to his previous experience of doing something with flowers, and acts accordingly. There need not be more than suggestion by similars. But when some day he is taught that the petal of a flower may be regarded as a modified leaf, he assimilates the idea in relation to a system of knowledge by which plant structures may be interpreted. Here there is not only suggestion by similars, but also recognition of similars. If, again, he be shown how this colourless liquid, when added to that

pale yellow liquid, gives a brown cloud, he assimilates this to his previous practical experience in the chemical laboratory, where a number of curious experiments are shown; but when he is taught that if ammonium hydrate and ferric chloride are mixed there are formed ferric hydrate and ammonium chloride, he may assimilate the interchange in relation to his system of knowledge about chemical reactions. If he really grasps the significance of the experiment he realises that it is an example of what may be illustrated by other examples. He sees the particular case in the light of a definite rule which forms part of a scheme of chemical thought.

It should be noticed that the mere addition of a new impression or a new idea is not necessarily assimilation. To be assimilated the new must be brought in line with and incorporated in that part of the practical experience or systematic knowledge with which it is congruent. The new must not, therefore, be *wholly* new. There must be some features which are sufficiently familiar to bring the partly new into line with previous experience or knowledge, and thus to enable the outstanding differences to be incorporated so as to extend and enrich that experience and knowledge.

I have spoken of meaning for the situations with which practical experience has to deal, in contradistinction to significance for the system. In the chemical laboratory a great deal of the experimental work of beginners has meaning long before it acquires its due significance. Adding this reagent to such and such a liquid means certain results—precipitation, solution, effervescence, or what not. We say that these results are obtained by mere rule of thumb; for rule of thumb is essentially the product of naïve experience, which fixes its eye upon the practical outcome without troubling about the underlying

causes or the significance for a scheme of thought. Now for a boy to go on for years in sole reliance on such rule-of-thumb manipulation—as used to be the case in the days which are sometimes spoken of as those of “mere test-tubing,” when a more or less mechanical process of qualitative analysis reigned supreme in the laboratory—is of little value as a training in scientific thought; but it may be a training, and a good one, in practical experience. Some such training is essential. For scientific thought, in such a subject, without facility in scientific work, without the ease which comes of familiarity with practical manipulation, may occasionally make successful examinees, in paper work, but will never make efficient chemists. The teaching of science in schools only rises to its full value when a body of practical experience, full of homely rule-of-thumb meaning from repeated manipulation, is allowed gradually to acquire significance for a growing system of theoretical knowledge in which the intellect moves freely and securely. And neither the practical experience so gained, nor the scheme of thought so developed, is of chief value in and for itself. The boy may never in his after-life have occasion to prosecute any further his scientific studies. Has the time devoted to them therefore been wasted? Not if his faculties have been thereby trained. Not if he have learnt from the special case the general lesson of the essential value of a sound basis in practical experience; of the methods by which a system of knowledge is founded on such a basis; of the paramount importance of keeping experience and knowledge in close and vital touch with each other. This he will find of lasting service to him, whatever may be his calling in after-life.

We have now to consider how the child gains such experience as will enable him to deal practically and

effectually with the situations of his daily life. We shall have later on to consider how he learns to extract from such experience the ideas which he builds up into a system of knowledge. There must first be perception having reference to things and events which mean something, before there can be conception of their significance for a scheme of thought. Both perception and conception are modes of cognition.

When we say that the child *perceives* that things are near or far, heavy or light, on this side or that, hard or soft, what do we understand by such *perception*, and how is such *perceptual experience* gained? Think what answer you would give in view of your own experience; and think of it in terms of what I have spoken of as meaning. We say that the glass letter-weight on the table looks smooth and heavy and hard, and at a certain distance. That is to say, the visual impression is such as to suggest that the object will be smooth to the touch, heavy if we lift it, resistant to pressure; and that to put these suggestions to the test we must reach out our hand to it, and perhaps walk a few paces first. The meaning of a given visual impression is in terms of cross-reference to other possible impressions. If we hear a lark's note above us during a Spring walk, we look up in the expectation of seeing it. Any presented experience has meaning in so far as it suggests other modes of experience. But how do we get these other modes of experience; how did we get them in the first instance when we were children? Always by behaving in some way at the bidding of a presentative impression; always by some sort of application of our every-day activities following on the sensory presentation. Now we have seen that our own behaviour and active movements afford a well-marked and readily distinguishable group of impressions—technically these

are termed *kinæsthetic* impressions, with corresponding kinæsthetic images. It is a noteworthy fact that any kinæsthetic image, especially if it is at all vivid, has a strong tendency to generate a motor impulse which shall call into action the behaviour imaged. If we think about moving one of our fingers, and try and picture what it would feel like to do so, we may find that the muscles of that finger are beginning to twitch, and perhaps ere long we shall bend the finger. Often this takes place just after we have been thinking of it. We have been inhibiting the tendency to bend it, and when the inhibition ceases the movement occurs.

The meaning, then, of any experience is in terms of other kinds of experience, and it is acquired through some form of behaviour, often some form of manipulation of that which is in this way becoming an object of experience. An impression which carries such meaning is raised to the level of a *percept*. Perception only occurs when such meaning is suggested. When we say that a child perceives that a brown object is a piece of chocolate, we imply that it has some meaning for the child as the result of previous experience. And since some form of behaviour is always implicated, it may be said that all perception involves kinæsthetic factors. That is a technical way of saying that whenever we perceive a thing, there is suggested something that we may or can do to it, or some form of behaviour as the result of its presence. Of course we may not actually do anything; but that is because the suggested behaviour is inhibited.

Although, however, we may quite clearly grasp the general truth of the fact that practical experience depends on meaning for the familiar activities of our daily life, it is not so easy to explain in detail the

manner of its origin. Not only did our early experience take form at a time of childhood to which our memories do not reach back; not only is it difficult or impossible to interpret what is the nature of the infant's experience; but, even in the case of the later development of the perceptual process, we are often at a loss to say just how it came about. For one characteristic of practical experience is that its possessor, unless he is accustomed to systematic introspection, finds it very hard to tell us how it was established. It has grown up so gradually; so much of it has been acquired subconsciously; it has passed to such an extent into settled habit; there has been so much of adding just a few successful touches here, and omitting what was redundant or led to failure there; it has, in a word, been developed so insensibly, that we feel disposed to say that the serviceable foundations of our daily behaviour have been established rather in us and for us by some kindly and beneficent psychological fairy, than by us through any exercise of our volitional powers. The fact is that much of our practical experience is organised in the region of non-attention; and yet more is, in adult life, transacted in that region, the field of attention being occupied with the end to be attained rather than with the practical means by which this attainment is reached.

It is part of the business of the psychologist, however, to make what goes on in the region of non-attention a topic of inquiry. In such an inquiry certain technical terms are helpful. The growth of experience, whether in the field of attention or in the region of non-attention, depends upon the *correlation* of the data afforded by the senses—and not only of the traditional "five senses," but also those which contribute to our experience of temperature, of changes in the direction of the movements of the

head or body as a whole, the organ for which is situated in the ear, and especially those kinæsthetic impressions which arise from the movements of our limbs and eyes. The two most important groups of correlations are—(1) those between the data afforded by external objects among themselves, for example between the sight of an apple and its “feel,” weight, temperature, smell, and taste; and (2) between these data and the kinæsthetic impressions derived from the behaviour which, in the above case for instance, the apple calls forth. Although these latter impressions originate within the body, the nerve-currents which give rise to the concomitant cerebral processes are brought by afferent nerves from outside the brain. In this sense it may be said that correlation deals entirely with data brought into consciousness. When we are regarding the matter, therefore, from the point of view of the acquisition and organising of experience, we speak of the correlation of the data afforded by the special senses among each other, and with those due to movements. But when we regard the matter from the point of view of the putting forth of the activities, we speak of the *co-ordination* of these activities. All matters of skill in the use of our bodily organs involve this co-ordination. Many muscles are concerned in what we are wont to regard as comparatively simple activities, such as walking or speaking. All these muscles have to be called into play in due degree, and with nicely balanced activity. We are not, however, conscious of the details of this process, which is, in fact, a physiological one. What we are conscious of is the net result of the process. We are conscious, that is to say, of the activity as a whole, not of the individual play of all the muscles which bring about the activity.

To do a thing, and to know how you do it, are two very different things. Ask a boy how he manages that clever

back-stroke at lawn-tennis. He cannot tell you: he does not know. He has no idea how he learnt to do it. He supposes it is practice. But he will show you how he does it with much pride and pleasure. The feat of skill requires a wonderfully nice and accurate co-ordination of activities, involving I know not how many muscles in various parts of the body: the impressions which accompany this co-ordination are correlated, and afford the data requisite for the maintenance of control over the activities in question. But what the co-ordinations are, the boy does not know, and probably does not care. They have been established subconsciously and are utilised subconsciously; and knowledge is a matter not of subconscious effects, but of that which is focal and definite to consciousness. It may perhaps be said that the correlations requisite for the performance of a feat of skill are not subconscious, but are unconscious; that the whole matter is one of mere bodily mechanism, and not psychological at all. Two replies may be given to such an assertion: a general reply and a special reply. The general reply is, that in so far as the skilled activity is a feat performed under guidance and control, the requisite data for such guidance must have been present to consciousness. It can hardly be maintained that the boy who makes the clever back-hand stroke at lawn-tennis is a mere automaton; his feat is the result of experience gained by frequent practice; and unconscious experience is a contradiction in terms. The special reply is, that if you attend to the matter you will be able to a large extent to make the subconscious correlations focal to consciousness. Then you will be able not only to perform the feat of skill, but to know, and to some extent to describe, how you do it.

Now there is a sense in which it may be said that the establishment of correlations is a matter of individual

experience, and is dependent upon the formation of associations within a psychological disposition. For a psychological disposition as such is not inherited, but acquired. The relation of correlation and co-ordination is, however, a very close and intimate one. This, at any rate, is certain: that co-ordinations of motor activity may be and often are inherited. Indeed it may be said that the basal foundations of all co-ordination are hereditary. The mechanism for reflex acts, for those automatic responses which have not to be learnt, and for all instinctive procedure—that carried out prior to individual experience—is part of our organic or biological heritage. But if the correlations of the data afforded to experience have to be individually acquired, and associations established anew in each child, how does the infant make a start in reducing the multitude of sensory data that rain in upon the dawning consciousness to something approaching serviceable order? In the first place, the data belonging to the first of the two groups I spoke of—those which afford material for the impressions of external objects and events—are not indefinitely commingled pell-mell and anyhow; they are ordered and graded in accordance with the relations of the environment. Sights, sound, touches, and so forth, come to the child in groups; there is a presentation of a more or less orderly situation, not a mere jumble of individual and separate sensations. All that is required, therefore, is that the connections between already-grouped stimuli should be established in brain and consciousness. I spoke of this in the second chapter as part of the primordial tissue of experience. What is inherited is a brain so organised as not only to receive the grouped stimuli but at once to link them by associative connections. That is to say, the correlation itself is not inherited; but the physiological conditions within the central nervous system

which shall form the organic concomitants of such correlation. This may seem a distinction without a difference. But it is in accordance with the view widely accepted, that experience as such is not transmitted through heredity. What is inherited is the brain which affords the physiological conditions for the genesis of experience. In the second place, the inherited co-ordinations of the motor activities, causing the muscles to contract and the joints to work in *their* already ordered fashion, secure that the data coming in from them too, shall be duly related in such a way that association can link them to their fellows within the co-ordinated group which is affording the material for correlation. And in the third place, the hereditary automatism of response, in reflex acts and instinctive procedure, further secures that the data afforded by surrounding objects shall be linked through association with those afforded by appropriate behaviour. So that, taking these three together, heredity, though it does not provide the correlation itself, does provide the organic conditions under which a correlation, from the first more or less orderly, shall be established. The further work of correlation is to knit all these data into a more and more serviceable web, in accordance with the growing meaning of acquired experience.

Let us now take one or two further examples of correlation. Suppose that we were blind and deaf; then, so far as our active life was concerned, we should be almost entirely limited to the correlation of the data afforded by touch and pressure among themselves, and with the data afforded to consciousness by the movements of our limbs. As we felt our way about the world, touches or pressures in various parts of our bodies would be associated with the hereditary or acquired movement of our limbs. The hands, and especially the finger-tips, are the central organs of touch—those which we bring to bear on an

object when we desire to make it focal to tactual consciousness. If, as we felt about the table, something came in contact with our wrist, we should at once move the hand and fingers so as to bring it to the focus of touch, that we might feel out what it was; as indeed we all do when we are groping for something in the dark. Thus we should organise what is called a *field of touch*, and, with increasing experience, this field would be better and better organised. Touches and pressures would mean more for us.

Now, suppose that to the sense of touch we add that of sight. This enables us to feel about us, so to speak, in a wider field,—that of vision. New and more widely serviceable correlations would be established. First of all those between retinal data and those afforded by the movements of the eyes. The field of vision becomes most delicately and accurately organised and interconnected, so that, if any object appears in the margin of that field, we at once move the eyes in such a way as to make it focal. And this involves not merely the co-ordinated movements of the two eyes in their sockets, but the changes of convergence and accommodation necessary for clear vision of things at different distances. The familiar experience of seeing an object at a certain distance is thus due to the correlation of retinal data with the kinæsthetic impressions which accompany the co-ordination of eye-movements and of the muscular processes by which the lens is accommodated for clear vision. But this, in the experience of daily life, takes place so completely in the region of non-attention that few of us realise that any kinæsthetic factors are present. Only when we make such an experiment as holding a pencil-point at a distance of about ten inches from the eyes, and alternately fixing them on this point and on some distant point on the wall, and ask ourselves whether we *can* attend to the kinæsthetic factors,

do we realise their presence. Under ordinary circumstances the feelings of eye-movements and accommodation, as such, are, so to speak, submerged, leaving only their practical meaning, namely, that the object of vision is situated out there, and at a certain distance from us.

But what does this visual distance-meaning itself mean? For common experience it has a very practical meaning. The child who sees a sweet on the table before him, reaches out his hand to take it up. Visual distance for him means distance in the field of touch. And if the object is farther off, so that he has to go to it in order to reach it, visual distance is correlated with distance for locomotion. Thus the field of vision and the fields of touch and of free movement are correlated. Furthermore, as we stretch out our hand to seize an object within our reach, we see it cross the field of vision; and a correlation is established between the movements of our limbs, as seen, and the same movements as given in kinæsthetic terms. Again, if we fix our eyes upon some object, and then move our hand in front of our face, still keeping the eyes fixed, we see the hand cross the field of vision from margin to margin; and if then, releasing our eyes from the object on which they have been fixed, we allow them to follow the hand, we experience a series of kinæsthetic impressions as the eyes turn in their sockets. In the one case the movement is a change of the position of an object in the field of vision; in the other case it is a change of position in the organs of vision. Or take another example. As I write, the rooks are returning to their nests and flying westwards past my window. I fix my eyes on the corner of the opposite house, and rook after rook enters and crosses the margin of my visual field. My eyes remain fixed all the time. But now I focus my vision upon a certain rook and follow him across

the sky, keeping him steadily in full view. As I do so, the house and trees opposite and the clouds in the sky seem to drift across my visual field as my eyes move, following the bird's flight. Thus when my eyes are fixed, there is a real movement of the external object, the rook, across the field of vision; and, when my eyes follow the rook, there is—(1) a real movement of the eyes, and (2) an apparent movement of the fixed objects round me, the house, trees, distant clouds. All these changes in the field of vision and movements of the eyes are gradually correlated for the purpose of practical behaviour. And when our bodies are also in movement, when we are walking or cycling or driving, further correlations are involved.

Besides those we have been briefly considering, there are also correlations of the data afforded by the sense of hearing, that of smell, our temperature senses, and those of direction, to which passing allusion has been made. But further examples of the process are unnecessary. It is sufficient to notice that all these correlations in the special fields of touch, sight, hearing, taste, smell, and so forth, together with those in the field of active movement aided by the sense of direction, gradually coalesce, and, becoming shot through and through with meaning, are organised into the wider and more comprehensive field, which we may term that of practical experience as a whole. Its development is a process of natural growth, like that of the plant which puts forth its shoots, leaves, and buds, and develops into a beautifully symmetrical tree, or like that of the child's own body, in which the limbs and all the organs develop in due relation to each other. While, therefore, it is probably true that the correlations of sensory data are not inherited, but have to be individually acquired, it is none the less true that it is due to the inherent and inherited tendencies of our mental

nature that we form such correlations, if the necessary data are duly supplied. There is no evidence that this, that, or the other correlation is inherited; but it is unquestionably true that the capacity for correlation is an inalienable mental possession. The sensory data of experience are the food of the mind; each individual has to find or to be supplied with his own food; but the power of dealing with the food, so as to build with it an organised and correlated body of experience—that is part of our hereditary dower.

But though the development of the body of experience is, in large degree, a process of natural growth, taking place in us and for us rather than by any definite exercise of our volitional activity, it must not be supposed that it is independent of, and out of touch with, either our voluntary behaviour in dealing with concrete situations or the later purposes and motives of our rational and moral conduct. The point is rather that, so far as the application of our conscious activities is concerned, attention is fixed chiefly on the completion of a concrete situation than the details of the means by which the completion is reached. More adequate and complete correlation, more effective and accurate co-ordination, are incidental to the development of the situation on which the attention is chiefly concentrated. In the training of hand and eye, the educational end of which is to establish a close, effective, and smoothly working correlation in the experience gained in the fields of touch, sight, and manipulative behaviour, it is not to the correlation, as such, that the pupil's attention is directed. It is directed to the accurate performance of a concrete task; it is directed to the doing of something well, rapidly, and effectually. At first it is done awkwardly, slowly, ineffectually. The requisite correlations and co-ordinations have not yet been knit

together in a working and workable part of the body of experience. There are redundancies here, inaccuracies there, and a net result of comparative failure. It is the failure which appeals to consciousness with a feeling-tone of dissatisfaction. But gradually the redundancies are eliminated, the divergencies from accuracy drawn into right lines, and in place of failure there is comparative success, with a feeling-tone of satisfaction. Just how the awkward redundancies have dropped out, and the crooked paths straightened, neither pupil nor teacher could probably tell. Practice has made perfect; but by what subtle details the relative perfection has been reached we find it difficult to say. It is part of the subconscious organisation of experience.

Regarded from the point of view of co-ordination we speak of this subconscious organisation of experience as the attainment of skill. The nicety of control that may thus be reached is truly remarkable. I have elsewhere¹ taken the case of the marksman at the rifle-butts as an example. At a distance of 1000 yards a deviation of the muzzle of the rifle by less than $\frac{1}{100}$ of an inch involves a deflection of the bullet, when it hits the target, of six inches from the centre of the bull's eye. The rifleman, we will suppose, is lying down, prone, supporting his elbow on the ground, and grasping his rifle, say, halfway between the fulcrum, where the stock is held to the shoulder, and the free muzzle of the piece. A deviation of the muzzle by $\frac{1}{100}$ of an inch to right or left involves, therefore, a deviation of the hand by half this amount, or $\frac{1}{200}$ of an inch. But the hand which moves, is carried at the end of a lever consisting of the fore-arm from elbow to wrist, and its movement is effected in the main by muscles in

¹ *Introduction to Comparative Psychology*, p. 164. Some further illustrations are also drawn from the same source.

the upper arm and around the shoulder. A relatively small movement of the point of free insertion of one of these muscles produces a relatively large movement of the hand and wrist. Hence it is certainly no exaggeration to say that the skilful marksman has his motor co-ordination under control within the $\frac{1}{1000}$ part of an inch; and this in the play of muscles which would not generally be regarded as susceptible of the highest delicacy of such co-ordination. But how far is he conscious where the co-ordinations are taking place? His business is to keep the sights in line; how this is subconsciously managed he is probably completely unaware.

And in the training of skill, do we not know from experience that an ounce of demonstration is worth many pounds of description? And when we do call in description as supplementary to demonstration we make no attempt to describe, even if we can do so, the motor adjustments; we deal with their effects. In teaching a boy to play billiards, we mingle some description with our demonstration; but it has reference rather to what he has to do, than to the subconscious means by which it is done. We say, "Hold your cue thus, strike your own ball here, moderately hard, and aim to hit the red on this chalk mark I make on it." He plays and fails. We explain that the failure was due to his striking his own ball too hard, and hitting the red too centrally and fully, and bid him try again. Gradually, after many trials, by subconsciously eliminating the errors of adjustment, he acquires the skill we would impart. But his attention has been fixed throughout on the effects produced by co-ordination, not on any details of the motor adjustments themselves.

And yet these motor adjustments, not indeed in their

details, but in their net results, enter into the web of subconscious correlation with sufficient accuracy to enable one to correct errors of co-ordination. Make a chalk mark near the centre of a blackboard, stand at a distance of ten paces, and, having taken a clear view of it, shut your eyes and point your finger at the chalk spot. You feel the movements of your arm (probably visualise the finger), and on opening the eyes find perhaps that you are pointing a little too low and to one side. Again shut your eyes and repeat the operation anew. You will probably find that you have somewhat over-corrected the previous error. But how could you have done this unless the net results of the motor adjustments afforded data taking effect in the marginal region of the field of consciousness?

There is one more general point to be noticed with regard to skill, especially with regard to those forms which are the outcome of intercourse. A good deal of the correlation involved has anticipatory value. Shortly after the ball has left the hand of the bowler, the batsman is prepared to strike in a certain way. Of course he is still on the alert; for the ball may shoot, and this will necessitate a rapid and special modification of the play. So, too, the fencer knows from the first movement of the button of his adversary's foil what is likely to follow; such a movement has acquired meaning; and the antagonist he fears most is the master of newly devised methods, the initial stages of which have not acquired such meaning.

It will be remembered that in the second chapter (p. 40) we reached a formula of wide range and running thus: Preparation; Presentation; Assimilation; Application. All training in skill affords an exemplification of this formula. The distinguishing feature of the assimilation

here, as throughout the whole range of practical experience as such, is that it takes place in the absence of any intentional analysis of the situations of daily life with the end in view of disentangling certain features common to diverse situations, and using them for the framing of a systematic scheme of knowledge. Experience grows by a sort of selective coalescence, by which new presentations are directly assimilated, so as to render possible a nicer and more delicate application of practical activities. This is the kind of coalescent assimilation which occurs when skill becomes more perfect through practice. Indeed, skilled behaviour (the skill itself, exclusive of any rational purpose which it may subserve), affords perhaps the best example of effective experience, gained almost wholly independently of systematic knowledge. In much of our adult life "knowledge about" overlies the more direct "experience of" things and events. Their significance for a system of thought comes to have for us more importance than their meaning for very practical behaviour. This is, however, less the case in matters of bodily skill dependent on abundant, direct, and unanalysed experience. Slightly vary the situation, so that the familiar application is no longer adapted to the presentation, and there results failure, all the more impressive since it cannot be readily explained; for explanation is a function of the system of knowledge which we are supposing to be relatively absent or in abeyance.

I used to ride a tricycle; for many years I have ridden a bicycle. After an accident a friend offered to lend me a tricycle, and suggested that I should try it. I did so, starting near the side of a road. I at once ran into the curb-stone. I remounted, and again turned the steering-wheel so as to run full tilt towards

the pavement. I tried the other side of the road, and ran into the pavement on that side. It was a sufficiently humiliating failure of skill in one who had said that he had ridden some thousands of miles on a tricycle.

Not without difficulty, I applied systematic knowledge to explain the failure, analysing the situation to find the exact locus of error. Believing that I had the clue, I then, to test the conclusion at which I had arrived, started in the middle of the road on the crown of its arch. I found that I proceeded on a straight course, so far verifying the results of my analysis. What is the interpretation? In turning a corner on a bicycle one is leaning over or inclined from the vertical in that direction to which one turns the handle-bar and front wheel. If a sudden gust of wind makes one lean over, one recovers by turning the bar in that direction. If one overdoes it, inertia causes one to incline to the opposite side, giving rise to a wobbling and sinuous course. Such inclination from the vertical, as a presentation, thus comes to mean for one's cycling experience a definite application in turning the handle-bar. The whole becomes closely coalescent in practice, though one may have no knowledge of the why and wherefore. Now when one mounts a tricycle and starts near the side of an arched road, the machine is leaning towards the pavement, one of the side-wheels being on a higher part of the road than the other; and this presentation is inevitably followed by the customary *bicycle* application: one turns the bar automatically, and finds oneself with ridiculous pertinacity running into the pavement. In the middle of the road one's position is vertical, for the two side-wheels are level. The leaning presentation is absent, and there is no tendency to turn the bar. Then one feels better.

The practical behaviour of those eminently practical beings, little children, is almost entirely dependent on experience due to coalescent assimilation without analysis, and untroubled at first by any of the explanations which are the applications of systematic knowledge. And many cases of apparent stupidity are due to the fact that the presentation of a new situation is not correctly assimilated to the previous experience of apparently (to us) similar, but really slightly different, situations. I will give an example from animal life, suggesting that many analogous cases may be found in the study of the behaviour of children.

Dr. Alex. Hill's fox-terrier Peter was taught to open the side door of a large box by lifting a projecting latch. When the door swung open he was never allowed to find anything in the box, but was given a piece of biscuit from the hand. The development of the situation was always to the end of thus obtaining a bit of biscuit outside the box. One day a well-browned, hot, redolent chop-bone was put inside the box, which was placed in a courtyard so that the dog would pass it when nobody was near, though he could be watched from a window. Details of the dog's behaviour are given by Dr. Hill in *Nature* (April 16, 1903, page 558). The net result was that the dog failed to apply at once his quite familiar experience of lifting the latch in the usual way. The situation, lonely box, and exciting grilled bone inside, was not assimilated to the familiar box-master-biscuit situation, and the central feature common to both—the lifted latch—was not grasped. He had no experience of finding bones, or anything to eat, inside; the meaning of lifting the latch was always, for him, the getting of a piece of biscuit from outside, and he failed to draw the conclusion, so obvious to us, that opening the door was the key to

the practical problem before him. He failed to assimilate the new presentations to his previous experience—or so it seemed. We may perhaps infer that he did not analytically compare the two situations so as to disentangle the essential feature common to both.

Many cases of apparent stupidity in children (an interesting field of inquiry) may be explained on similar lines. They are due to incapacity or temporary failure to grasp analytically some important feature embodied in the presented situation—a feature obvious enough to us, but not seen by them, as the hinge on which the successful application of experience turns.

Now a great deal of early education is concerned with the imparting of skill, and it is difficult to exaggerate the importance of a varied training in this respect. It is unquestionably part of the means by which the individual is brought into vital touch with his environment. Involving as it does the constant correlation of the data of sense, and the nice co-ordination of motor activities; essentially practical and in close touch with real things; fostering habits alike of close observation and of accuracy of performance; necessitating the steady application of means to a definite end in view; lending itself admirably to an elementary appreciation of the value of accuracy, and fostering a desire for its attainment;—on all these grounds a training in skill should form a prominent feature in our educational system.

For the training of the finger muscles, Slöjd, drawing, and the playing of a musical instrument—best of all, if there is a good ear for music, the violin—are admirable. The wider and more varied the training, the better; for our object is to give to the fingers a skill which may eventually be applied to anything from tying a knot or a

white tie, or sewing on a button, to the most delicate touches of art on the one hand, to the equally delicate touches of scientific manipulation on the other hand. I asked my dentist some time ago how he maintained such wonderful delicacy of control over his finger-muscles. "Chiefly by practising scales on the piano," was his reply. Does not this indicate the kind of answer which may be given to some of those short-sighted people who are always asking what is the good of this or that training for future life? If piano-drill is of value for the practice of dentistry, may not other forms of training find their application in quite unexpected ways? Whenever I find a student who displays unusual delicacy in dissection, I inquire how he or she has trained the finger-muscles so as to have them so well under control. Often I have received for answer that they have not been specially trained in any way. But on further inquiry I have generally elicited such answers as, "Oh yes, I'm fond of drawing—just sketching things that strike me, without any knowledge of the subject," or, "Well, I've always been rather given to carving boats, and the knobs of sticks, and odd things, but I never learnt to do so." No doubt such answers indicate a natural gift which has found expression in these ways; no doubt there may be some whose fingers are, by nature, "all thumbs," but probably if these "thumbs" are only trained at a sufficiently early and plastic stage of development, they will, in nine cases out of ten, turn out to be very respectable fingers.

And we must never forget the value of this delicacy of skill—which must in some way be trained in early life—in its application to much that is highest in human endeavour. In many departments both of art and science, skill is essential as the medium of expression of that

which takes form in the mind of the artist or man of science. In painting, technique may be inferior in worth to inspiration; but of what value to mankind is the inspiration of the painter or sculptor if his skill in technique is inadequate to embody his ideal? What do we not owe to the marvellous interpretative skill of such a pianist as Paderewski, or such a violinist as Joachim or Lady Hallé? How much of the value of anatomy and surgery to man would be excluded if we failed to include the marvellous skill in their application which characterises a great operator? Of physical science it is scarcely too much to say that it owes its present position to the application of skill to the making of delicate apparatus, and the execution of experiments of extreme nicety. Skill in the manufacture and skill in the use of the microscope have done much to make biology what it now is. In a word, skill is the faithful and unwearied handmaiden which ministers both to science and to art.

For the training of the larger, coarser body-muscles, Swedish drill, the gymnasium, dancing, and our national games are of the utmost value; and to these the exercises of the kindergarten may readily be made to lead up. What our national games have done for the English race it is difficult to over-estimate. Apart from contributing to the development of a serviceable body of practical experience, they play a definite part in the organisation of intercourse. They afford a valuable discipline in what may be termed social co-ordination. An old soldier standing by my side during a well-contested school match once said to me, "That's the training for our future soldiers and sailors." A good football team, a good eleven, a good eight, work together for a common aim, and learn to combine their skill with due co-ordination and due sub-

ordination. The playing-fields are the finest school of organised co-operation in the world.

It should, of course, be remembered that I am dealing with the development of a body of experience, having real value under the conditions of social intercourse. I am not at present concerned with the development of a system of intellectual knowledge. And in urging the importance of our national games, in their proper place, I do not mean to imply that this should be regarded, as by some it seemingly is regarded, the place of supreme honour. To say that our national games have real educational value is not to say that they should monopolise the attention either of boys or their parents. When they have fulfilled their educational function they should drop into a subordinate position, though they may form a basis of recreation, and the training they have afforded may be of life-long value both to those who would otherwise lead too sedentary a life, and to those whose future career may demand other applications of the skill and temper and social co-operation they have helped to develop.

We may now return to the question which was put some pages back, and summarise the answer. That question was: What are we to understand by the terms "percept," "perception," and "perceptual process"? Let us start with the "impression," remembering that this term has reference to a "factor" disclosed by analysis within a larger "presentation." Such a presentation forms part of what we spoke of as a developing "situation." When an impression carries "meaning" in terms of previous experience, it is raised to the level of a percept. But this is still only a factor within a larger whole which we have termed a "disposition." A disposition is the sum of a number of factors. The term has

subjective reference to the person who has the experience; while the situation has objective reference to that which is being experienced. To deal in some way with an impression, in accordance with its meaning, is characteristic of the first stage of perception. Since, at the outset, meaning is always for some form of practical behaviour, perception involves kinæsthetic factors. Such factors are probably never absent in the primary genesis of perception. To deal surely and effectively with the familiar situations of daily life, in accordance with their immediate and direct value for practical experience, is the outcome of perceptual process.

The eminently practical experience so gained is, as mental development proceeds, made subservient to intellectual ends; and behaviour is modified in relation to schemes of ideal construction, involving considerations extending beyond the immediate situation. The stages of development of this higher ideational process we shall have hereafter to consider. At present they are not in the field of our special attention. We have been dealing, for example, with manipulative skill, and control over the bodily activities, independently of the intellectual processes which they may subserve, or with only such allusion to these processes as may serve to show how important practical experience is as the handmaid to her mistress, the intellect. And in some branches of educational procedure special stress should at first be laid on homely meaning, in terms of the correlation of the data of experience, the emphasis on intellectual significance being reserved for a later period, or but sparingly introduced.

In the early stages of science-teaching the aim should be to develop rather a body of practical experience than a system of scientific knowledge. In the chemical and

physical laboratory it is familiarity with processes of manipulation, and a direct acquaintance with how things react on each other, and how they behave under given circumstances, that have to be acquired by the pupil, so that he expects this or that result in just the same way as he expects what the football or cricket bat will do as he uses them in the playing-fields. But often the teacher is so saturated with systematic principles, and so eager that the pupils should reach scientific conceptions, that he hurries on to impress on young minds the significance of phenomena for the system of knowledge before the phenomena themselves have acquired homely meaning for the situations of the laboratory.

There is also a tendency, among some advocates of science-teaching, to lay so much emphasis on the value of chemical and physical experiment and manipulation as to ignore the claims of such observation as is fostered by *nature-study*, while even those who urge the importance of nature-study make it from the first too rigidly systematic and too scientific; too much botanical, or zoological, or geological; too little the acquirement of a direct practical, unexplained and, as yet, inexplicable acquaintance with the sequence of natural events. Nature-study for quite little folk is not elementary botany or zoology, or any other 'ology. It is a body of practical experience which may some day be interpreted in the light of scientific conceptions. It is frankly observational, and deals with the *how* of natural processes and events in garden, field, hedgerow, and upland moor, by the pond-side and at the seashore—not at all with their *why*. That is systematic science, not nature-study, the aim of which should be to establish a number of correlations among the data which experience in the country affords. But it must be real experience, not information alone,

though information may and should be given as an indication of what to observe, and as a descriptive aid to observation in progress. And here again we must bear in mind how unreasonable it is to turn children out into the country and expect them to observe without any previous guidance as to what to look out for—any indication of the lines along which observation should be directed. For assimilation to take place there must be a congruent body of experience which shall play its part in the process. The new things to be observed must be related to what has already been assimilated. In other words, for fruitful observation there should be due preparation. With minds prepared by descriptive information, closely related to what has been previously acquired by direct contact with nature, children are able to assimilate what would otherwise pass unnoticed. And such experience should be gained in the early days of life when the mind is plastic and correlations of all sorts are readily established, and when the links of association hold firmly. It is difficult for the teacher in training for elementary school-work to acquire in the limited time at his disposal this kind of familiarity with nature. Work in the classroom will not give it: lectures, though they may stimulate and guide observation, and be really helpful to those who use them as subsidiary aids to and preparation for actual experience, by themselves merely afford information about nature, not the intimate and first-hand acquaintance with living things which is wanted. In the upper and middle classes it is to the mother and the governess that children should look for help and encouragement in gaining a form of practical experience which will be a life-long source of pleasure. But too often they look in vain. How many parents, themselves ignorant of the fresh and simple meaning

of a thousand occurrences in the cycle of the year, consider it worth while to inquire whether the governess whom they engage for the education of their children has any intimate acquaintance with such matters?

CHAPTER V

SYSTEMATIC KNOWLEDGE—IDEAL CONSTRUCTION

IN the practical experience which was considered in the last chapter we deal with concrete situations as wholes. It is true that each situation has a centre of interest in accordance with the meaning it possesses for the purposes of behaviour. But we need not, and generally do not analytically consider the relation of this centre to the rest of the situation, at the moment of prompt and vigorous action. To do so we must analyse our experience, and such analysis is a necessary step towards the higher synthesis implied in a system of knowledge. When we analyse a substance chemically we split it up into its constituent elements. We may examine a drop of water with the highest powers of the microscope, and we shall not be able to distinguish the constituent oxygen from the constituent hydrogen. But when we take pure water and by appropriate means analyse it chemically, we separate the constituent hydrogen from the constituent oxygen. We may term this kind of analysis *dissociating analysis*. But if instead of pure water we select such a substance as a piece of granite, we may analyse it to some extent without submitting it to the process of chemical dissociation. By careful examination with the naked eye or with a lens, we may distinguish the constituent minerals, the quartz, the mica, the

felspar, and so forth. We do not dissociate them in this case, we leave them just as they were; we merely distinguish them. And in doing so, we may fix our attention first on the quartz, to the subordination of the mica and the felspar; then on the mica, to the subordination of the other two constituents; and then on the felspar in like manner. This we may call *distinguishing analysis*, as contrasted with the dissociating analysis of chemistry.

From the psychological point of view it is with distinguishing analysis that we are chiefly concerned, though dissociating analysis may be, and often is, employed as a means or an aid to help us or our pupils to distinguish more clearly. For example, in dealing with a plant we teach a child to distinguish roots, stem, leaves, and flowers, and within the flower to distinguish bracts, petals, stamens, and pistil. But as an aid to making the distinctions clear, we may dissect the flower and separate the parts. In either case we successively make predominant some particular factor or group of factors in a complex whole, and bring out the relationships of the several factors to each other within the whole. This involves comparison of the several parts. And when we lead the child to compare a number of flowers, we help him to frame a schematic flower, not perhaps exactly corresponding, point for point, to any particular blossom, pimpernel, bean, snapdragon, or daisy, but such that any one of these may be regarded as differing examples falling within the flower-scheme. The schematic flower is a product of ideal construction; the child who frames it has some systematic knowledge. The course of procedure in such a case is from the whole as presented to naïve experience; through the distinguishing of parts, properties, or qualities, to the reconstituted whole as presented to systematic knowledge.

Now the phrase "ideal construction" carries with it the

implication that the constituent factors are ideas. The nature of ideas, as contrasted with images, was indicated in the first chapter. But we must understand how they are formed in the child-mind, and how we minister to their formation. Analytic comparison is essential to the process, and to this end there must, in the objects dealt with, be points of similarity notwithstanding difference, and points of difference in the midst of similarity. The things must be comparable, but they must also be distinguishable. In the kindergarten we place before children a number of objects; some are round, some square, some triangular; some are red, some green, some blue; some are made of paper, some of metal, some of flannel. Any given object is both red, square, and made of flannel; or blue, round, and made of paper; and so forth. We group the reds, greens, and blues together irrespective of shape and material, and, after mingling the objects again indiscriminately, bid the children group the colours. In doing so we render this particular character predominant for the children's attention. Then we classify again in respect of shape; and subsequently once again in accordance with material. Perhaps some of the children make mistakes; put blues or papers together in a class, when we tell them to select all the squares. We correct their errors. And we help our pupils to grasp that though shape, colour, and material are combined in every object, yet for the immediate purpose in hand one matters, while the others do not matter. In a colour classification shape and material do not matter: in a shape grouping, the colour which mattered so much just now, no longer matters. The abstract idea of some quality is that which at the moment matters; other qualities are present, but they don't matter. But when the "does-matter" idea of blue is disengaged, it is not only abstract but general.

It applies to all the blue objects and to any blue object. Any particular case is just an example of blueness. And the disengaged ideas are free to combine in new ways. It so happens that, among the objects, there is no example of a triangular green bit of flannel. But by putting the three ideas together in constructive synthesis the child can picture what such an object would be like if there were one. Such synthesis is a simple case of ideal construction.

Now let us suppose that children are receiving elementary instruction in length or in weight. There is a further exercise in comparison. This piece of string is longer than that piece of worsted; the material does not matter, length does. This cube of cork is lighter than that round bullet. The fact that it is larger does not matter; but it will matter if we are dealing not with weight but with size. Longer, shorter; heavier, lighter; larger, smaller, involve the relationships of things to each other in certain selected respects. When we say that a swift is bigger than a sand-martin, one strawberry sweeter than another, one note struck on the piano higher than another, selected relationships are involved. There is in each case a transition in experience which is of a certain appreciable kind. In cases of deliberate comparison we go to and fro from one to the other perhaps several times. In tuning the second string of a violin to the A note on the piano we alternately pluck or bow the string and touch the piano key. After a while we are satisfied that the transition in experience, though it involves a difference in timbre (which does not matter), is from like to like in pitch. And what our attention is fixed upon is this relation of the two notes. We feel, too, that the consonance is what we want; that we have produced a particular example of what we understand by

the term "similarity." Ideas of relationship are essential factors in systematic knowledge.

It must be remembered that we so habitually think in terms of the relationships which in the course of our systematic education have been rendered explicit, that it is somewhat difficult for us to realise the mental position of the animal and the little child for whom they are still merely incidental and implicit. Size, weight, distance, position, and so forth, have relational meaning before they acquire relational significance. The bigger thing simply means a wider grasp; the heavier thing, more output of energy; the more distant thing, a longer reach; the thing on one side, a movement of the eyes or limbs or body as a whole in that direction. Only when the relationships involved in such procedure are disentangled so as to be compared with other like relationships, does the particular case acquire significance for a systematic scheme of sizes, or weights, or distances. The first step, then, towards a system of knowledge, is the disentangling of relations, with a view to their comparison; and this involves rendering them explicit and making them special objects of attention.

Using the word "perception" in the sense indicated in the last chapter, according to which the "percept" is an impression which has acquired practical meaning, the question arises whether we may consistently apply this term to the initial phases of the process we are now considering. Perception deals with the concrete situation; and unquestionably the relationships *within the concrete situation* are the first to be grasped. It is always the relation between this and that object presented to the child's experience that we seek to bring out clearly. True it is that the end we have in view is the attainment by the child of systematic knowledge; but assuredly the child has, as yet,

no conception of that end. True it is that we have here the means by which abstract ideas are reached; but they are here only just being disengaged from concrete experience. It seems, therefore, justifiable to distinguish two stages in the perceptual process: first, that in which the relations involved are as yet implicit and embedded in the situation which has meaning for practical experience; and secondly, that in which the relations are rendered explicit, but still as constituent factors in a concrete embodiment. This stage we may speak of as that of the *perception of relations*. In the former edition of this book I restricted my use of the term "perception" to the latter stage. But I do not propose here to press a usage which in some respects runs counter to that of other writers. If we regard the rendering explicit of the relations in practical experience as the final stage of perception; we may also regard it as the initial step towards the higher and more complex process of ideal construction; and we may thus understand how practical experience and systematic knowledge are closely linked together.

It may be well to set forth briefly the stages of development beyond the bare impression, remembering that the impression itself is only a factor in a larger presentative situation.

1. Formation of percepts of the first grade (impression *plus* meaning), and of corresponding images within the body of practical experience.

2. Disentanglement of qualities and relations through comparison. The perception of relations leading to the formation of free ideas.

3. Further analysis of a complex presentation into factors (ideas) in relation to each other and to the whole.

4. Recombination through constructive synthesis into concepts.

5. Building of concepts into a related system through further ideal construction.

6. Apperception of concrete case as an example or illustration of some portion of the system of knowledge.

The term *concept* is introduced under the fourth heading. We will understand by *conception* the synthetic process by which general and abstract ideas are put together so as to form a more complex whole for thought. Ideas are thus reached by the analysis of experience: concepts are reached by a synthesis of ideas. The word "animal" for example, answers to a concept; and in a definition of the term the leading constituent ideas are enumerated. As we shall presently have occasion to see, however, ideas and concepts are very closely related, as are also ideational and conceptual process. *Apperception* is the technical term which may be applied to the realisation that some particular case is, as stated under the sixth heading, an example or illustration of, let us say, some general rule or principle. Happy the boy who thus apperceives the rider set in a geometry paper. If, when we see a bee entering a sage-flower, we regard the procedure as affording an instance of the fertilisation of flowers by insects, we apperceive its biological significance. Again, Tennyson's lines—

"His honour rooted in dishonour stood,
And faith unfaithful kept him falsely true,"

may be apperceived as affording examples of the figure of oxymoron. In perception there is meaning for practical experience: in apperception there is significance for a system of knowledge. There is assimilation of the particular case in relation to the ideal construction (apperceptive assimilation); and there is application of the system of knowledge as throwing light upon the special example before us.

It will be remembered that towards the close of the second chapter a distinction was drawn between spontaneous attention and the will to attend. The latter implies the existence of some motive or motives for attending. These motives have to be taken into consideration. Some more or less systematic plan of life has taken shape as an ideal construction. The value of attention is apperceived in relation to wider ends, which embrace far more than is comprised within the particular situation of the moment. Again, in the last chapter a distinction was drawn between the practical meaning, in terms of direct observation, which experiments in the chemical laboratory may acquire, that is to say, the expectation begotten of experience that certain results will follow; and the significance that these results may have for a systematic knowledge of chemical reactions. We may now say that, when this significance is grasped, the particular case is apperceived as an example which illustrates some general principle. So, too, in the case of the failure of adjustment of bicycle practice to the altered circumstances of riding a tricycle; it is only when the facts can be explained that there is any apperceptive assimilation. This, indeed, is involved whenever there is interpretation.

Whenever, therefore, a particular example is regarded as a case which falls under and illustrates a universal principle, a general rule, a natural law, a moral ideal, a canon of art, we have apperceptive assimilation. But this implies that the general principle has already been reached by comparison (involving analysis and abstraction) and through generalisation (involving synthetic construction). These fall under the category of ideational and conceptual process, as distinguished from the less complex type of perceptual process which is involved in the simpler and

more direct forms of assimilation within the sphere of naïve practical experience.

Let us now bring this into line with the schematic formula given in previous chapters (pp. 40 and 106). We have Preparation; Presentation; Apperceptive Assimilation; Application. But since apperceptive assimilation involves comparison and generalisation, the formula may be written thus: Preparation; Presentation; Comparison; Generalisation; Application. We thus reach what is only a modification of the five formal steps of Herbart. The preparation at this stage of mental development is in itself in large measure ideational. But it implies also an adequate preparation in the perceptual experience which is its precursor. Just as racial preparation is a prerequisite of instinctive behaviour, and just as instinctive behaviour affords a preparation for intelligent modes of application, so does concrete experience of the perceptual order prepare the way for the higher ideational process. This does not, of course, exclude the important truth that yesterday's ideational process forms part of the preparation for to-day's fuller apperceptive assimilation. We must not accept any schematic formula in a narrow and pedantic spirit. In a sense it may be said that when once systematic knowledge has begun to take form, it so suffuses itself over the whole range of mental operations as to raise the formula to a higher intellectual level in all its terms.

In educational procedure the preparation takes the form of calling up into the field of consciousness of the pupil such portion of the systematic knowledge he already possesses as shall be relevant to the new presentations which are introduced. These are then dealt with by the ideational process, skilfully and sympathetically guided by the teacher, so that there shall follow apperceptive assimilation with the attendant expansion of the growing system

of knowledge, which is then tested by gauging the pupil's ability to apply it to new cases and further examples.

There is always a danger, however, lest a rational formula should degenerate into a prescribed formulary. The Herbartian steps are, I believe, based on secure psychological foundations. But they are sometimes pedantically regarded as a rigid mould into which every lesson must be squeezed. And some of the model lessons given in text-books show the distortion which results from an undue emphasis on the letter of the law to the exclusion of its essential spirit. The quick insight of the born teacher enables him to detect the faults of his brother who has merely been made on a stereotyped pattern. And he is led to exclaim: "Better the unmethodical procedure of mother wit than the methodism of all his formal training." His attitude of impatience is not unnatural. But even the born teacher will perchance find the spirit of the Herbartian formula vital with quickening interest if he will submit its leading principles to a process of apperceptive assimilation or mental digestion. And, after all, there are not enough born teachers to go round. We must make the best of a pretty considerable percentage of merely manufactured articles, with all their faults and formalisms.

Granted, then, that some such formula as has been suggested should appeal to the teacher as worthy of his consideration, even then he must be careful to interpret and apply it with tact and judgment. Perhaps the chief difficulties of interpretation are due to the fact that the modes of application in behaviour or conduct which I have attempted logically to distinguish as instinctive, intelligent (or perceptual), and intellectual (or ideational), are, in child life, frequently in co-operative inter-relation. There is not any given epoch at which the instinctive procedure

due to racial preparation ceases and gives place to intelligent behaviour due to the preparation afforded by naïve experience ; nor is there a succeeding epoch when intelligent behaviour is entirely supplanted by rational and systematic conduct.* Instinct affords the basis on which intelligence is founded : perceptual behaviour in the concrete situations of practical life yields the material for analytic treatment to the end of attaining systematic knowledge. Intelligence is constantly utilising all that is the outcome of a prolonged racial preparation : rational conduct involves the fullest possible use of all that has been gained by simpler modes of experience. Child life and adult life are one and continuous. The interpreter has to analyse out the factors, estimate their relative values, and recombine them in the ideal constructions of synthetic treatment. This is no light or easy task. And he who would attempt it must call to his aid all the resources at the command of the man of science and use them with all the sympathetic insight of the constructive artist.

The inter-relation of the factors is again well seen in educational procedure. We recognise that descriptive work must go on side by side with explanation. The apprehension of descriptive work is relatively on the plane of naïve perceptual experience, while the comprehension of what is set forth in an explanation, is apperceptive, and is wholly on the plane of ideational process and systematic knowledge. A due balance must be kept between the two. So, too, in the procedure of science, skill in manipulation is relatively on the perceptual plane. The purpose to which the skill is applied may be systematic and related to the increase of scientific knowledge. Here, again, the factors are in the closest relationship. But this does but emphasise the desirability of an analysis by which their distinctive features may be rendered clear.

In the analytic comparison and synthetic generalisation which are necessary to all clear and accurate thought, the qualities or attributes of objects, and their relations to each other, are dealt with for a definite purpose, and with a distinctive end in view. This purpose or end may very probably not be foreseen by the pupil; but it should always be present to the mind of the teacher. And if his procedure be methodical and well-ordered, its significance will in due course be apperceived by those to whose intellectual development he ministers.

Among the relationships which are implicit in the familiar situations of our daily life, are those which we term numerical and quantitative. The ideal constructions of mathematics enable us to deal with them in the light of systematic knowledge. It will be convenient to illustrate from the simpler arithmetical operations the psychological principles involved in ideational and conceptual process. But it must be remembered that my primary object is not to indicate how arithmetic should be taught, or how the number scheme which we employ first arose in the minds of men.

All numerical operations are based in the first instance on a system of counting. Each count has a name, and also a symbol, for purposes of notation; both names and symbols are assigned on a systematic plan in order that counting and notation up to the highest numbers may be facilitated. Two things, though obvious enough, are noteworthy: First, that the system is applicable to the counting of any objects or any operations; apples, boys, shillings; paces, elections, battles. Thus if a count of 5 be regarded as an operation, we may perform the operation seven times. Secondly, the order of counting is immaterial—not, of course, the order of naming or symbolising the counts, but the order in which the objects are selected for counting.

It does not matter, for the number-scheme, with which one begins, or with which one ends, so long as one counts each object, and counts it only once. The single object is termed the unit, and this unit may be quantitatively indefinite. Thus in counting boys or apples, their size and weight do not matter: each counts as a unit.

Let us now take a simple case of the application of this system. We enter a room in which there are many people. For practical experience, in the absence of a numerical scheme, there is just an indefinite manyness of persons. A systematic operation makes this definite. How? First we part the individuals (by distinguishing analysis) into units; secondly, we count them, and find that our operation reaches its limit when we reach the number 53. If we have counted them all, we have now a definite manyness expressed by the name fifty-three. Our analysis has been followed by a synthesis for the purpose in hand. But the result of such analysis and synthesis for the attainment of systematic knowledge is a concept. It involves the combination of the ideas "unit" and "count-limit." We now understand what is meant by saying that number is a concept, and that it is reached by a process of analysis and synthesis, or, as it is sometimes termed in this connection of "parting and wholing." We see, too, how the simple operation of counting is the application of a systematic number-scheme, which is an ideal construction, to our concrete experience.

Now suppose the people in the room are in groups. There are three in the first row, five in the second row, nine in the third row, and so on. We may then reach the number of persons by the *addition* of the numbers in the several groups. We have learnt, and the child has to learn, the result of adding group to group. These results are memorised: three and five are eight, and nine are

seventeen, and so forth. Such addition is a short-cut to save the labour of counting all the units: the addition sum is put down in a special way; and is by the child soon dealt with as part of an abstract number-scheme, irrespective of what the numbers represent — apples, or marbles, or persons. With high numbers certain rules of “carrying” must be observed, and these can only be understood when the system of notation is adequately grasped. It is clear that addition, and its correlative subtraction, are schematic modes of dealing with count-groups in accordance with certain general rules.

The ideal construction of mathematics is raised to a higher level for systematic knowledge, when the unit itself is quantitatively definite; for example, when we speak of twelve inches, six pounds, and so forth. The unit is here of the same order as the whole under consideration. It is a quantitatively definite unit of weight, of length, of time, and so forth. Such units are indispensable for exact measurement. Again, let us take a particular case. I have a walking-stick, and I wish to know its length. Note the abstraction involved for our present purpose. Its thickness, its weight, its strength do not matter; nor does it matter whether it is of oak, cane, or blackthorn. From our special point of view there is just an indefinite muchness of length. We require to make this definite. Comparison is involved. But we are not merely comparing it with another stick, and saying that it is longer or shorter. We are comparing it in numerical terms with some selected standard of length, by means of which measurement may be made systematic and described in units of general validity. We take an exact unit of length, say an inch. We analyse the whole length dividing it up into unit parts, distinguishing but not separating (cutting off) these inch parts. Then we count them, and find that thirty-six

is the limit of our counting. We have now, by parting and wholing, reached a definite muchness of length. There is, indeed, a little bit over; but we may for the moment neglect that.

This example serves to bring out the nature of quantity as continuous, while number is discrete. In continuous quantity we have to distinguish the unit parts, but need not separate them into a discrete number of parts. Still we only get a definite expression of quantity when we can give the number of unit parts which are present in the continuous whole. Even then there may be a bit over. What can we do with it? We can divide our unit as we divided our whole. Let us divide it into ten parts, and call each a tenth of an inch. We count the tenths in our bit over, and find that there are seven of them. That is sufficiently exact for getting the length of our stick. But for scientific purposes of measurement we may have again to divide our tenth of an inch into ten parts, which we call hundredths, and so on. If we are measuring the circumference of a circle in terms of the diameter as a quantitative unit, we find that there are three times the unit + 1 tenth + 4 hundredths + 1 thousandth + 5 ten thousandths + 9 hundred thousandths, and so on. But no matter how many times we divide the bit over into tenths or decimal parts, we never reach a limit to the process. The quantity cannot be numerically expressed with final accuracy in terms of this unit. But the approximate number we obtain is true of any circle regarded as an ideal construction—that is, one more perfect than any particular circle which was ever drawn. The expression in numerical terms, though we cannot attain a limit of exactness, is universally true of all circles.

Measurement of quantity inevitably leads to fractional parts, and is the easiest educational avenue to the compre-

hension of fractions, and the operations employed in dealing with them. A fractional part is termed a derived unit. Thus the inch is an example of a primary unit, and the tenth of an inch a derived unit. In vulgar fractions the value of the derived unit is seen in the denominator, and the number of times it has to be taken in the numerator. Thus $\frac{7}{8}$ is seven counts of $\frac{1}{8}$ as a derived unit. What it is derived from depends on the kind of measurement, in inches, feet, miles; in pounds, ounces, grams; in days, hours, seconds; and so forth. Children should not at first be allowed to deal with any fractions without being helped to realise of what primary units they are fractional parts. Later on they may be taught to deal with fractions within an abstract number-scheme. They will then be sufficiently advanced to grasp that what the unit may be does not matter. The operations on fractions are the same in the abstract, whether they are fractions of seconds, of pounds avoirdupois, or of the distance of the sun from the earth, regarded as an astronomical unit. But I repeat, the child should, at first, be taught to deal with fractions by practical measurement. If we take a strip of paper a foot long and divide it into fourths, a second strip into eighths, and a third into sixteenths, the child may be easily led to see that $\frac{1}{4}$, $\frac{2}{8}$, and $\frac{4}{16}$ are all of exactly the same length. He is thus led to compare; and he will learn that the same length may be expressed in more than one way, or that two or more expressions indicate operations leading to the same result. But he should clearly grasp that the operations are different. It is not the same operation to divide the strip into eighths and into sixteenths; nor is it the same operation to take two counts of the one and four counts of the other. When the number-scheme is practically applied, it depends entirely on the purpose in hand whether we divide into eighths or into sixteenths. But

within the number-scheme the combined operations of parting and wholing give equivalent results. In this or in other ways the child may be introduced to the conception of equivalence and its symbol. He may be led to grasp what is meant by saying $\frac{6}{8} = \frac{3}{4}$. He will learn that the symbol for equality = always invites a comparison of the expressions it connects. Now for comparison, as we have seen, it is necessary that the objects of sense-perception or of thought shall be—(1) comparable, and (2) distinguishable. There must always be similarity notwithstanding difference, and difference in the midst of similarity. Here we have similarity of result, notwithstanding difference of operations. At a later stage, by comparing a number of such expressions, such as $\frac{4}{5} = \frac{8}{10}$; $\frac{14}{100} = \frac{7}{50}$, he will be led to see that the number of counts always varies inversely as the magnitude of the parts which are counted. He reaches a generalisation which is universally applicable. It is on such generalisations that rules are founded. Under bad teaching the rules are learnt by heart, but the generalisations on which they are based are not understood. A boy, for example, may learn that to double the value of a fraction he may either halve the denominator or double the numerator. But why these different operations should give the same result may remain an insoluble mystery.

We shall revert to fractions and their equivalence presently. Let us now return to whole numbers. The child can count out twenty marbles. We tell him to count them out in equal groups of five, and then count the groups, of which he finds that there are four. Again, we bid him count them out in equal groups of four, and then count the groups; of which he finds that there are five. He will realise that four counts of five give the same result as five groups of four. It may be

convenient to put this before him in schematic form, thus:

a

It does not matter, so far as the result is concerned, whether this expresses a group of four taken five times, or a group of five taken four times. The symbolic expression is $4 \times 5 = 5 \times 4$, or since this is true of any numbers it may be put in a more abstract form, $a \times b = b \times a$, where a stands for any given number and b for any other given number. But we need a short-cut by which we can proceed at once from the number of counts in the group, and the number of times the group is taken, to the result. This short-cut (to avoid the labour of counting all the units seriatim) is the operation of multiplication. It involves the memorising of the multiplication table and the application of certain rules. It forms no part of my purpose to enter into details. It suffices to note that we have a systematic method of dealing with counts of counts. If we wish to ascertain how many counts must be taken five times to give the whole number forty, or how many times a count of ten must be taken to give forty, we employ the rules of division. In both division and multiplication we have parting and wholing, not only in counts but in counts of counts; and this involves a higher synthesis.

I have drawn attention to the fact that the two sets of counts are interchangeable without affecting the result. Numerically, $4 \times 52 = 52 \times 4$. It is perhaps worth noting that though the order does not matter *within the number-scheme*, yet in practical life it might matter much. It might make a great difference to poor folk whether

they were promised 4s. a week, or 52s. quarterly. They might be terribly pinched before the first quarter's payment was due.

It may be well to carry the consideration of the number-scheme just one stage farther. This is the stage at which the unit is defined in quantitative terms of independent value, when we speak, for example, of a pound of rice as worth 2d., or say that a cubic centimetre of water at a certain temperature weighs one gram. This enables us to bring the most diverse things into relationship for the purposes of our social life, and to compare wholly different units in terms of some third unit. The value of three acres of land is, let us suppose, 47s. Here the unit is implicitly defined, not in terms of area, but in terms of shillings. If I wish to know what is the value of twelve acres of adjoining land at the same rate, I have so to divide the twelve acres as to find out how many counts of three-acre groups there are in it. I find that there are four. I must therefore take four counts of the three-acre value, namely 47s. I thus get the value of the larger field—188s. Wherever we have units defined in terms of independent value we have to deal with counts of counts of counts. In the case above we have four counts of three counts (acres), each of which is, in value, forty-seven counts in shillings. Put in another way, we have to grasp that twelve acres is four times three acres, and that three acres is, in value, forty-seven times 1s.

Let us, however, consider this example from a slightly different point of view. Remember that the essential feature of ideational process is that it involves comparison, and that it also involves such analysis and synthesis as shall facilitate the comparison and render its outcome clear and definite. Now in the example I have taken we have first to compare a three-acre field and a

twelve-acre field in respect of their magnitude. We have seen that the concepts "3" and "12" imply the analysis into units and the synthesis named by the count-limit. When we compare the two fields we analyse both into the acre-unit, and combine the two analyses into one synthesis. The name given to this synthetic concept is *ratio*. We may write it, 3 : 12; but the essential point is that we have to regard this expression as that which symbolises one synthesis, and not two independent numbers or terms. We may also write it as a fraction, $\frac{3}{12}$. Now a fraction is always a fraction of something. Take the case of the slip of paper which we divide into twelve parts, of which we take three. When we write $\frac{3}{12}$ we mean three-twelfths of the whole slip. We are comparing a three-inch slip with a twelve-inch slip, and stating the ratio of the one to the other. And that is exactly what we are doing in the case of the three-acre field and the twelve-acre field. Here the three-acre field is what we start from. If we start from the twelve-acre field and compare the other with it, the ratio is $\frac{1}{4}$. Suppose we started from it and compared it with a one-acre field, the ratio would be $\frac{1}{12}$. This we write as the whole number twelve. Thus we shall understand what is meant by saying that every number is a ratio.

But we have seen that a little familiarity with fractions enables us to grasp that $\frac{3}{12} = \frac{6}{24}$. What we do here is to compare the ratio $\frac{3}{12}$ with the ratio $\frac{6}{24}$. When they are equal the four terms are said to be *proportional*. The essential feature of proportion is the comparison of ratios. We have to take the expression as a whole, and grasp that it is symbolic of a higher synthesis. Each ratio is a synthesis: but the proportion is a synthesis of syntheses. We are now in a position to see the great importance of proportion when we are dealing with expressions involving

independent values. In the case of our fields we have $\frac{3}{12} = \frac{47}{188}$. Here we pass from the ratio comparing sizes in acres, to the ratio comparing values in shillings, and see that the sizes and values are proportional.

It forms no part of my purpose to consider the methods of working sums in proportion. I must, indeed, again remind the teacher that my sole object is to illustrate from very elementary considerations of number and quantity, how by analysis, synthesis, and comparison we reach the ideal constructions which are applicable to the problems which are presented in the course of the practical experience of social life. Ratio and proportion are, as we have just seen, successive steps in analytic and synthetic procedure. Continuous proportion involves a higher synthesis. We have to grasp a series of numbers in which each bears the same ratio to the one which succeeds it. The numbers are, then, continuously proportional, or in geometrical progression. Thus 2, 4, 8, 16, 32, etc., are in geometrical progression, since $\frac{2}{4} = \frac{4}{8} = \frac{8}{16} = \frac{16}{32}$, etc. We have here successively counts, of counts, of counts of counts, etc., or $2, 2^2, 2^3, 2^4$, etc. But enough has probably been said to show that every general rule involves a process of ideal construction, and that the value of such ideal construction is to enable us to deal with practical situations from a selected standpoint and for special purposes.

Let us now consider how we reach systematic ideas and conceptions with regard to space. The relationships involved are implicit in practical experience. What becomes space for systematic knowledge is, for the dog or the little child, simply room to move about in, and room occupied by other objects which more or less restrict these movements or modify the behaviour.

The field of vision is spread out before the eyes, and its spread corresponds to the spread of the retina. It is

spoken of as *extensity*. Within the retinal extensity the constituent points are differentiated in such a way as severally to afford the stimuli to eye-movements appropriate to bring the point stimulated to the focus of vision. This differentiating feature is termed a *local sign*. The correlation of these local signs, within the extensity, with the kinaesthetic factors due to eye-movements, give the visual field that meaning for practical experience which is implied in the word *extension*. Other correlations of the data afforded by convergence and accommodation give, as we have seen, the meaning which is implied by the word *distance*. The further correlation between these visual data and those of the fields of touch and free movements of the hands, arms, and body, gives extension and distance serviceable meaning for all the requirements of practical experience.

We start, then, with such experience from which are extracted ideas of free movement, when there is room to move, and limitations of such movement due to the presence of other objects. We wish to frame an ideal construction which will enable us to deal systematically with the spatial relations. Let us proceed by the method of abstraction. Here is a blackboard. We will consider the possible movements on its surface. Of course other movements away from its surface are possible; but for our present purpose they do not matter. But there are an indefinite number of directions in which movements may take place on its surface. Any movement, however, must be either (1) up or (2) down, or (3) to right or (4) to left, or some combination of these, such as up and to the right, or down and to the left. We thus, by analysis and synthesis, obtain four, and only four, uncompounded directions; all others are compounds of two of them. But up and down are directly opposite directions; as are also

right and left. We need a term which shall include the to and fro in opposite directions. That term is *dimension*. On the blackboard surface, then, there are four primary directions in two dimensions.

But "up and down," "right and left" have reference to our own position as we stand erect and face the board. In further ideal construction this personal reference is superseded. For dealing with movements in flat-land, or any position therein, reference is made to two dimensions. We may, for simplicity, assume that the two *axes*, from which measurements are made, are at right angles, one vertical and the other horizontal. But they need not be horizontal and vertical; nor need they be at right angles. Much mathematical work has reference to oblique axes. There must, however, be two axes; the plane surface of flat-land has always, for ideal construction, two dimensions.

Now let us leave the surface of the blackboard and consider the other possible movements which we have so far purposely neglected. How many other possible primary and uncompounded directions are there? Only two—away from the surface into the room or in the opposite direction through the thickness of the board. They may be also up or down, to right or to left; or more generally, for a special scheme, within the two dimensions already considered. The two new directions constitute for ideal construction a third dimension, which may, but need not, be at right angles to the plane of the other two. Every direction and every position in the space of which we have practical experience may be defined in terms of these three dimensions, the outcome of our ideal construction framed for the purpose of dealing accurately with positions and changes of position.

Reverting to our blackboard, its surface, which the carpenter has made smooth and flat, has no thickness.

It is the boundary between wood and air; and our idea of it as such is reached by abstraction. Of course if there were no board there would be no surface. In getting an idea of surface, however, I am thinking of the boundary itself, not of that which is bounded. 'But the edge of the blackboard is also a boundary. It is a line. It, too, has no thickness, nor as a boundary has it any breadth. It has length without thickness or breadth. If it be a straight line (from the carpenter's standpoint) it runs smoothly and evenly. Movement along it is only possible in two opposite directions and in one dimension. I may draw a straight "line" in ink on white paper. But such a line has breadth. Still the boundary between the black mark and the adjoining part of the white surface is a line for ideal construction. Now let two such lines be drawn so that they intersect. Where the boundary of one ink "line" cuts the boundary of the other ink "line" is the *point* of intersection. It has no parts and no magnitude. It is simply a position. It has no dimensions, and there is no possible movement therein. The full-stop at the end of this sentence is not a point. There would be plenty of room for a microscopic organism to move about in the space it occupies. But the position of its ideal centre would be a geometrical point.

For the ideal construction of systematic thought the "room to move about in" of practical experience has three dimensions. A limitation of such space to two dimensions gives us the idea of a plane surface; a further limitation to one dimension, to that of a line; a yet further limitation to mere position, to that of a point. If we grasp the significance of the term "point," we shall see that the expression "movement within a point" is nonsense. But the expression "movement of a point" is not nonsense. Combine the ideas suggested by "movement of a point in

one direction": you reach the concept straight line. It is absolutely and ideally straight. Further, combine the ideas suggested by "movement of a straight line at right angles to its length in the second dimension": you reach the concept plane superficies. It is absolutely and ideally plane. Once more combine the ideas suggested by "movement of a plane superficies along another straight line at right angles to it"; you reach the concept of cubical space in three dimensions. Regarded as analytical stages in the limitation of our thought, the plane and the line might be spoken of as ideas; regarded as synthetic stages in the expansion of our thought, as concepts. But since they may be either, or both, it is clear that the distinction cannot be very consistently preserved. Hence it was said a few pages back that the idea and the concept are very closely related.

In exact thought we further combine the concepts of number and quantity with those of space. We may say, for example, that a point moves along a straight line through a space of five inches. Here we have a count in inches as units. Now suppose that a straight line five inches long moves at right angles to itself through five inches. The area traced out has five counts of the length of the line which was also five counts. But counts of counts is reached by multiplication. Hence to obtain the area we must multiply five by five. When the counts are the same the number is squared 5^2 . If the plane surface of 25 square inches moves at right angles to its plane through 5 inches, a cubical space is traced out. We have counts of counts of counts. The number 5 has to be cubed, and in the space thus ideally constructed there are $5 \times 5 \times 5$, or 5^3 cubic inches.

Since spatial relationships are peculiarly susceptible of exact measurement, space-units are much used in science

as independent values of other magnitudes. All our exact measurements of time are reached indirectly through space measurements—the space traversed by the sun or the stars, by the hands of a clock, by the shadow in a sun-dial; in King Alfred's days, the space by which the length of a burning candle was diminished. Any magnitude may be represented by a spatial magnitude. Thus we reach the graphic method of presenting the results of all sorts of exact measurement, of which an example will be given in the eighth chapter (p. 224).

In geometry a special mode of measurement is adopted as an ideal construction. Instead of imagining a line moving at right angles to itself, let the position of one of its boundary points be fixed, while the whole line swings round this point. The other boundary point will trace out a course termed a circle. One 360th part of a complete revolution is termed a degree; and the degree is an angular measurement. Thus the line may swing through 10° , 20° , 30° , and so forth. The inclination of two lines to each other under these conditions is an angle. An inclination of 90° is a right angle. These familiar facts are mentioned to show that angular measurement is a special mode of ideal construction, which has advantages under special circumstances. It is employed, for example, in defining accurately the position of places on the earth's surface.

Our notions with regard to the shape and size of the earth are the outcome of systematic knowledge. We are apt to take over these notions on hearsay, and thus to pass them on to our pupils. But they only become part of *our* systematic knowledge or that of our pupils in so far as we adequately grasp the nature of the ideal constructions involved. That the surface of the earth, irrespective of the irregularities of mountains and valleys, the smooth surface of the ocean, for example, is not a flat plane, is

shown by the well-known fact that when ships sail away from any point on the open sea, first their hulls, and then their lower sails and yard-arms disappear from view. This is in accordance with an ideal construction of a curved or arched surface; and the fact that the amount of disappearance is the same in all directions is in accordance with our knowledge of convex surfaces of equal curvature. The amount of that curvature has been accurately measured, for example, along the surface of a canal near Bedford. But a surface of equal convex curvature in all directions is in accordance with one, and only one, ideal construction—that of a sphere—the value or amount of curvature affording a means of determining the size of the sphere.

Now it is one of the properties of the sphere—it is involved in the ideal construction—that the radii are all of equal length. And it is another property that if any two radii are inclined at an angle of say 1° , the distance between the points at which they intersect the surface, measured along that surface, is constant in value. The arcs subtending an angle of 1° are all equal—but it has been found that the length of a degree varies at different parts of the earth's surface. It is longer near the poles than it is near the equator. The ideal construction of a sphere will not accurately fit the facts disclosed by exact measurements along large stretches of the earth's surface. That surface is one of varying curvature. It is flatter near the poles than it is near the equator. The ideal construction, termed an oblate spheroid, more nearly fits the facts. Furthermore, the length of any radius can be deduced from the rate at which a pendulum swings. This involves a physical ideal construction involved in the law of gravitation. Note that it is a case of measurement in terms of independent value. And note that it implies a synthesis of the concepts of physics with those of geometry.

Details are unnecessary. It suffices to say that the measurements of earth radii show that our globe is not a sphere, and not an oblate spheroid, though it pretty nearly approximates to the latter figure.

It should be remembered that these probably familiar facts are adduced in illustration of the process of ideal construction and its relation to the facts of observation. Certain observations suggest the spherical form as applicable to the earth's surface. But further observations show that this ideal construction will not square with all the facts. The construction has to be modified so as to embrace these outstanding facts, and we reach the oblate spheroid. But yet further observations disclose other discrepancies, and the ideal construction has again to be modified. And so on. In the earlier systems of astronomical knowledge the construction accepted was one in which the earth was the centre of the solar system, and the sun, moon, and planets revolved round it in circles. But the movements were found to be not circular. The construction would not fit the facts, and had to be modified. Each member of the solar system was made, in the amended scheme, to revolve in a circle around a centre, which itself revolved in a circle around the earth as a centre. Thus arose the doctrine of cycles and epicycles. By repeated reconstructions on similar lines this interpretation became hopelessly complicated. A new ideal construction had to be tried with the sun, and not the earth as the centre. This in turn has undergone many modifications, leading up to the existing ideal construction of astronomy.

To return to the determination of the position of places on the earth's surface, there are two reasons why angular measurements are adopted; first, they enable us to neglect the different curvature of the surface in different regions; secondly, they enable us to use the fixed stars for the

measurements of angular values. The size of the earth is so small in comparison with the enormous distances of these stars, that the angle made by a straight line drawn from any place on the earth's surface, say to the pole-star, with the straight line from the centre of the earth to that star, is so minute as to be negligible. Now what is meant by saying that the geographical position of Tintagel is $50^{\circ} 40'$ N. latitude and $4^{\circ} 45'$ W. longitude? That it lies in this N. latitude signifies that a radius of the earth which cuts the equator makes with the radius that cuts the earth's surface at Tintagel an angle of $50^{\circ} 40'$, and that it lies in the northern hemisphere. There are, however, certain conditions which must be fulfilled as part of the ideal construction. The point on the equator, Tintagel, and the earth's centre must lie in a plane perpendicular to that of the equator. How can the latitude be ascertained? The plumb-line points to the centre of the earth in the direction of a radius; continued outwards into the heavens, it indicates a point among the stars. If a telescope at Tintagel be directed to that point, and then turned on its axis so as to be directed to the pole-star, it will rotate through an angle of $39^{\circ} 20'$. But the equatorial radius makes, with the polar radius, an angle of 90° . Hence if the angular value of the inclination of the polar and Tintagel radii be subtracted from 90° the latitude of the place is obtained. All the necessary observations can be made at Tintagel; but they have reference to a world-wide ideal construction.

We are all familiar with the lines of longitude drawn on the map. That of Greenwich passes through all places north and south of Greenwich to the poles. All these places lie in one plane. From this plane we in England reckon longitudes E. and W. up to 180° . That which contains Tintagel lies at an angle $4^{\circ} 45'$ W. of the plane of the Greenwich longitude. By what observations can

the longitude of Tintagel be determined? Here again we have a case of measurement in terms of independent value. It is noon at any place when the sun reaches its highest point in the heavens for the day in question. It takes the sun twenty-four hours to perform its apparent course, which is a measure of 360° in angular value. We know that this signifies one complete rotation of the earth on its axis; and our number-scheme enables us to find that rotation through 1° takes four minutes of time. But noon at Tintagel is later than noon at Greenwich; and the time-difference gives a measure of the longitude. The time of noon at Tintagel can be ascertained by observing the exact moment when the sun is highest in the heavens, and this can be compared with the time of noon at Greenwich. It is found that noon at Tintagel is nineteen minutes later than noon at Greenwich; and the angular value of nineteen minutes is $4^\circ 45'$, which is therefore the longitude of the place.

Such is the ideal construction of special relations which are employed in defining geographical position. It is surprising how many people use the terminology without an adequate grasp of its significance. This is, however, by no means an isolated case in which we use concepts without the full realisation of the analysis and synthesis through which they have been reached. We all do it, scores of times every day. The point that I have desired to render clear is that every concept and all systematic knowledge may be shown to have arisen through processes of comparison, of analysis and synthesis, of abstraction and generalisation. That we usually do not, and often cannot, render the steps of the process explicit, merely shows how much of the common stock of thought we habitually take for granted. It is the office of the teacher to minister to the development of systematic knowledge in the minds of

his pupils; and he should not be ignorant of the nature of the processes by which ideal constructions take form and shape, and the manner in which they are applied to particular and concrete cases, so as to shed upon them the light of thought. If he grasp the psychological principles underlying ideational and conceptual procedure, he will be in position to apply them in the discharge of his duties in any field of systematic knowledge. How best to apply them will afford full scope for all his tact and judgment.

There are certain familiar maxims of method which are commonly accepted as guides to educational procedure. That we should proceed from the concrete to the abstract, is clearly in line with the psychological course of development from perceptual experience to systematic knowledge. It indicates that there must be adequate preparation and presentation, through which the pupil may be led on to generalisation. But we must not forget that there should also be application, and that the value of abstract knowledge is to enable us and our pupils to interpret concrete phenomena; so that we should proceed from the concrete to the abstract in order to come back to the concrete with improved mental vision. Again, we are bidden to proceed from the indefinite to the definite. This procedure has, I trust, been sufficiently illustrated above. We start with a more or less indefinite whole of practical experience, and by analysis and synthesis reach definite conceptions of the same whole within the sphere of thought. But when we have reached exact knowledge we are constantly applying it so as to render definite that which is still indefinite. We are in a sense reversing the procedure. In other words, we are now adopting that third maxim, which bids us proceed from the known to the unknown. Indeed, taken separately, these two maxims are seemingly antithetical. For the indefinite is the relatively unknown,

and the definite, to which we pass, the known. It would be absurd to say that our course should be from knowledge to ignorance. The fact is that these two maxims must be taken as complementary to each other. We are further bidden to proceed from the simple to the complex. The meaning of the maxim is sufficiently clear, and its validity, properly interpreted, is evident. But we must bear in mind that ideal constructions have for their purpose the simplification of our thought concerning complex and multifarious phenomena, and that in grasping the unity which underlies the multiplicity of diverse phenomena, we are passing from the complex to the simple. On entering upon the study of any new subject we are weighed down by a sense of its complexity; as we proceed we are in due course gladdened by a sense of the simplicity of its essential framework. Each of the above maxims, then, may be justified on psychological grounds; but each must be accepted and applied with a dose of judgment.

We have seen that in passing from naïve perceptual experience to the ideal constructions of systematic knowledge, the processes of abstraction, generalisation, and inference reach intellectual maturity. It must be remembered, however, that each process has its germs in unanalysed experience. A centre of interest for perceptual life—that to which attention is spontaneously drawn—is the precursor of the more highly developed abstract idea. It is that which matters for perception. Again, to behave in a similar manner to objects of like character serves to differentiate these objects as a group, within which the salient qualities stand out for the guidance of action. And this is the germ out of which the more explicit process of generalisation arises. All meaning implies generic meaning. Furthermore, things which have acquired meaning beget expectation, which is the pre-

cursor of logical inference. Many of the inferences, as we commonly term them, of daily life are confident expectations resulting from repeated experiences under similar circumstances. Whether they should, in strictness, be termed inferences is a question of definition into which we need not enter. There is continuity in mental development. If in our thought we lay the chief stress on this continuity, we shall, to that end, apply, as do some authors, the same terms—abstraction, generalisation, inference—to both the perceptual and ideational stages within the curve of a continuous development. But if in our thought we lay the main emphasis on the differentiated stages, we shall for that purpose reserve, as other authors do, these terms for the processes as they occur at the higher level of systematic knowledge and ideal construction.

CHAPTER VI

THE FIELD OF INTERCOURSE—IMITATION AND SELF- ASSERTION

INCIDENTALLY, but perhaps only incidentally, it must have become evident that ideal constructions are social products—that they imply a field of human intercourse within which they are developed. Let us try and render explicit some of the characteristic features of this important factor in mental development. Just as knowing, feeling, and doing are, in the closest possible manner, inter-related in personal experience, so are they related in many and varied ways to the experience of others. This is evident even at the outset of child life. But with the growth and extension of systematic knowledge there comes a fuller realisation, reached by parallel and connected steps, of the self, of other selves, and of the world in which they live and which they endeavour to interpret. In history and literature and the humanities, the interaction of persons, under the guidance of purpose, is in the foreground of attention. But even in the scientific disciplines the personal and social reference is present. The boy who is learning chemistry in the laboratory is gaining knowledge of the ways in which substances react on each other, but he is also becoming better acquainted with his own powers of manipulation and understanding, or their limitations; and he is realising what other boys and his

master can do and know. And if some of the salient historical facts with regard to the course of discovery are skilfully introduced, his social outlook is quickened. Not only Mr. Brown, but Lavoisier, Cavendish, and Dalton are his masters. In biology he is learning from Cuvier and Darwin. Hutton and Lyell speak to him of geological changes. The ideal constructions of astronomy have not only reference to planets and stars, but to Galileo, Kepler, and Newton, and to a self which is richer and stronger through its knowledge of astronomical science and its communion with the thoughts of great men.

In a sense every one of us is strictly confined within the relatively narrow limits of his own experience and knowledge. These limitations are, however, not only intolerable in themselves; but we gaily disregard them throughout the whole field of intercourse; and that just because we are social beings. When an event happens, how it strikes us or how it affects us individually is not the only question; there is the further question, how it strikes or would affect others. This is always present in so far as we take up the social attitude. No doubt we have to interpret the experience of others in terms of our own; but this implies the conviction that they have *their* own experience which we may so interpret. When we are in a very sophisticated mood we may perhaps say that what we have in mind can only at best be the manner in which we conceive that others are affected. But normally and naturally we regard others as persons in their own right, and not only under the sufferance of our modes of conception. And we all do it. It seems to be one of the conditions under which the game of life is played. This is because we accept *as an ideal construction* a field of intercourse of which distinct persons are constituent members.

The steps by which this ideal construction was reached, and those by which this constant reference to the thoughts and feelings of others grew up, are not easy to trace. The whole problem of the perceptual origin of a basis in experience for the later conception of self, of not-self, and of other-self, involves difficult questions which cannot here be discussed at any length. The child's feelings of satisfaction or the reverse, his restlessness or quiescence, his emotional stirrings in anger or fear, the aches and pains which he carries about with him through diverse situations—all these form a nucleus of self-reference. The child does not trouble his little head about subject and object; he just feels his own body tingling in a very characteristic and quite unmistakable way. From this there is developed at a later stage a notion of an embodied self—the happenings of the little world within his skin being his in a sense that other happenings are not. Yet later, by further abstraction, arises the more subtle ideal construction of a subjective Ego somehow associated with that part of the not-self which is called the body. But much of the experience of the little child is gained through impressions of sight, touch, hearing, and so forth, and all this is referred to objects around him towards which he has to behave in varied and appropriate ways; and ere long he distinguishes two groups, one comprising those objects which are comparatively inert, like tables and chairs, sticks and stones; the other containing objects which behave towards him in ways like those in which he behaves towards them—such as mother and nurse, for example, brothers and sisters, and (with a difference) dogs and kittens. The distinction is somewhat hazy to begin with, but it gradually becomes more clear. When we remember to how large an extent behaviour contributes to the development of all forms of perception, we can

well understand how the different behaviour in presence of these two groups contributes to the perception of the radical distinction between animate and inanimate objects. And we must assume, if we are unable to prove, that the child projects into mother and nurse, brothers and sisters, other-selves analogous to himself. Only at a later stage, however, will this dim awareness of community of nature be supported by a reasoned inference that since others act as he acts they probably feel as he feels. The difficulty is to put into words the early perceptual phase of dim awareness, since words such as those used above, "community of nature," stand for definite concepts, which have not yet taken anything like form or consistency. We need not enter further into the genetic problem. It suffices for us to remember that there are good grounds for believing that every step towards the realisation of the conception of self is also a step in the realisation of other-selves, and conversely, every step towards the better understanding of others contributes to further self-knowledge.

There can be little question that, apart from the use of language, the functions of which we shall have to consider in the next chapter, one of the chief avenues leading up to the development of social relations, and the special modes of experience to which they give rise, is *imitation*. There is also, as we shall see, the impulse to opposition and self-assertion; but it will be well to consider imitation first. Through imitation the child enters into and assimilates the traditions of the race—those ways of behaving which are handed down irrespective of heredity. The child is born into a community of which the members are doing a number of things in a variety of ways—in the nursery or schoolroom, for example. Insensibly he catches up from others their modes of behaviour, and thus becomes a participator in the social life within the field of inter-

course. Nor is this subtle contagion restricted to childhood. In fashion and manners and morals we are all subconsciously influenced by the example of others. All this arises out of an inborn tendency to behave as we see others behaving. It is the outcome of a special form of racial preparation. Children often cry or laugh or act in other ways for no other reason than that they see or hear others doing so. They behave instinctively. They do not mean to imitate. They just do so because that is the way they are made. There is no imitative intention. It is said that a wag, strolling into a meat-market on a warm day during a slack time, tried the experiment of a portentous yawn. In a few moments all the bored butchers'-assistants were yawning as if impelled to do so by some stern necessity. They didn't intend to yawn: there was no imitative purpose. Under the conditions of boredom, if they saw someone yawning they must e'en yawn too. The behaviour of the wag just gave the requisite suggestion serving to call forth the similar behaviour, which, since it is similar, we term imitative. There is no deliberation, no exercise of volition; the response is automatic, and rises little above the level of a physiological response to the stimulus.

The records of hypnotism are full of cases of slavish imitation under conditions in which deliberation seems to be wholly absent and the volitional nature appears to be lulled to sleep. For in this strange abnormal state the exercise of the personal will seems to be in abeyance. One of the characteristic features with regard to the whole range of observed mesmeric phenomena is the lack of initiative. Presumably there is no imitative intent; the "subject" is a living automaton. And yet one may see a hypnotic patient follow in every detail the acts of the controlling mesmerist—rub the back of

his head, pass his hand across his eyes, unbutton his waistcoat, fling his handkerchief upon the floor, and so forth; being seemingly reduced to the level of a mere imitative machine. Of course all this falls under the head of "suggestion"; but where, as in such cases, the suggestion afforded by a given mode of procedure produces behaviour of like nature, the procedure is obviously in line with the phenomena of imitation, which under the hypnotic influence seems to be wholly subconscious and devoid of guiding purpose. Such, also, is some of the imitation of children. "Going out with the child F.," says Professor Tracy, "I observed that she did almost everything I did; I brushed some dust from my coat, and she immediately brushed her dress in like manner. It is, in fact," he adds, "difficult fully to realise how the child is watching our every movement, and learning thereby. Not only parents and teachers, but every one who comes in contact with the child, even casually and occasionally, contributes his share, whether he will or not, to the child's education. The moral of this is too obvious to require repetition."

So far we have had chiefly in view the hereditary basis of imitative procedure. Observers are in substantial agreement that it is first seen in children during the latter half of the first year—say from about seven months onwards. At about the close of the first year it assumes a position of much importance for the furtherance of mental development. For though it is instinctive in its nature and dependent upon a specific mode of racial preparation—being characterised by the fact that the presentation and the behaviour-application are of like nature, still its psychological value (as in the case of all instinctive procedure) is that it affords to the individual new modes of experience. It leads the child

to take up into the field of his own behaviour the traditional behaviour of his companions, and thus to learn what it feels like to act as they are acting. It leads to sympathy. It is thus a social factor of great value, and has a potent educative influence in raising the procedure of the younger up to the level of the somewhat older and more developed. It widens and enriches experience by introducing the imitative child into new situations, and thus revealing meaning which would otherwise have remained undiscovered. An extravagant example is sometimes helpful. The following illustration may seem both extravagant and trivial, but may serve as a parable. A well-brought-up little boy in irreproachable velveteen suit has, under suitable guidance, passed puddles in the road a hundred times. He goes out one day with a harum-scarum urchin, who tramps through them and becomes pleasantly dirty: he follows this new lead, and enters a field of experience, the thrilling and delightful meaning of which would, under less happy circumstances, have never been opened up to him. Henceforward he can sympathise, as he could not before, with those who are forbidden to mess in puddles.

We may perhaps regard this as an unsatisfactory enlargement of the boy's experience. But imitation is no respecter of persons or practices. It is more probable that it will lead him into the pranks and reprehensibilities common to boy life, than into the prim ways of maiden aunts. As we watch boys or girls in their natural life we constantly observe that someone in the field of intercourse becomes the central model for imitative behaviour. Why this one and not another should be the one to set the tune to which he dances, he probably could not say. Presumably it is an inherited or acquired consonance of nature. In the poultry-yard the chicken

falls into the ways of other chicks, and often follows some particularly active and vigorous young bird, but ignores those of ducklings, just because he is a chick and not a duckling. The mischievous child follows every possible lead into mischief, the lazy into indolence, the vigorous into all active exercise. For each there are certain centres of influence which appeal to this or that trend of the imitative impulse. And this affords to the teacher a helpful insight into the nature and character of the child.

It is unnecessary to say more on this head. I may repeat, however, that it is scarcely possible to over-estimate the importance of imitation as a means of bringing the child's social behaviour into line with that of his classmates and those who are his fellows and companions in a common field of intercourse. By doing what they do, he learns what it feels like so to act. He realises his own powers and limitations; and he realises, too, the powers and limitations of others. He gains a sense of the value of social co-operation. As he imitates the procedure of others in dealing with the things around him, the objects become centres of a common and social reference. They are not only objects within his own experience, but they are objects within the experience of his companions. As he regards them, so in like manner do others regard them. The world around him is not only his world, but their world also. And as he imitates their ways of dealing with the world he makes it more his own, fuller of meaning for his private and personal experience; and, at the same time, he sees how full of meaning it is, too, for them and for others.

When once the child is through imitation initiated into any situation, the operation of the perceptual process determines his further behaviour. Pleasant situations

are again sought; unpleasant situations are avoided. All this is in line with the whole development of practical experience. But there seems to be a special and peculiar satisfaction which, in some cases, attaches to the imitative process as such. Thus the child seeing and hearing someone produce a sound, for example a musical note or a simple word, imitates at first imperfectly, then with better results, and perhaps goes on repeating the sound, often with wearisome reiteration, apparently for the pleasure experienced in the mere consonance of the sound with the model and with those already produced. So, too, other imitative actions may be oftentimes repeated, just to get them better in accord with those which suggest their performance. But here we have the tendency, so strong throughout the development of practical experience, to fix the attention rather on the product than the process. It is the sound produced, that is to say the result of activity, rather than the means by which it is produced, that is in the focus of consciousness.

We have two words, "copy" and "imitate"; and commonly they are used interchangeably. Thus in the language of proverb we say that monkeys copy their masters, and that imitation is the sincerest form of flattery. But it might be well to differentiate their use; and to employ the term "copy" when we reproduce a product, and the term "imitate" when we are guided by the manner in which it is produced. Thus we copy a picture, but we imitate the handling of the pencil or brush, and the way in which certain effects are attained. We imitate the potter's procedure; but we afterwards copy the vases he has made. Since this usage is, however, not established, we may take copying as the form of imitation towards which practical experience has a tendency to pass. In demonstration as an aid

to the acquirement of skill we show the means—not, indeed, the inner means of physiological co-ordination, but the visible means as expressed in active behaviour,—by which the skilled act may be reached. Even here, however, imitation of the manner of doing is only a transient stage; the attention is soon transferred to the thing to be done, rather than on the manner of doing it.

Generally classed under imitation is the copying of outlines or drawings. Professor Mark Baldwin describes some interesting experiments with his daughter, in which such procedure was made the subject of investigation. Selecting a few objects well differentiated in outline,—animals which she had already learned to recognise and name after a fashion,—he drew them one by one on paper, and let her imitate the “copy.” The observations extended from the last week of her nineteenth month to the middle of the twenty-seventh month. The results show that, with this child, up to the beginning of the twenty-seventh month there was no connection apparent between “a mental picture in consciousness” and the movements made by the hands and fingers in attempting to draw it. The “drawing” was simply the vaguest and most general imitation of the teacher’s movements, not the tracing of “a mental picture.” There is practically no resemblance in the examples he gives between the indefinite, at first angular (but later on more curved) lines, and the object set before the child as a copy.

But early in the twenty-seventh month a change came. Professor Baldwin drew a rough human figure, naming the parts in succession as they were made: his daughter suddenly seemed to catch the idea of tracing each part, and she now for the first time began to follow the order she saw her father take: “head” (circle) at the top; “body” (ellipse) below; “legs” (two straight lines) farther

down; "arms" (two lines) at the sides of the body. It was all done in the crudest fashion, as would be expected from the lack of muscular co-ordination. But the fact was unmistakable that with the simplification of the figure of breaking it up into parts had come also the idea of *tracery imitation*, and its imperfect execution. "By the 'idea' of tracery imitation, I mean," says Professor Baldwin, "the sense of connection between what was visually in her own consciousness and the movement of her own hand or pencil. The visual pictures or copies had been there in all her previous trials, and so had the hand movements, both the sight of them and the muscular (kinæsthetic) sensations; but there had been no sense of a connection between them, and agreement in the result when they were compared."

This is a point of considerable interest. It comes to this: that up to a certain stage there is no realisation of the fact that imitation may subserve an end or purpose, that of more or less accurately reproducing the copy; and no comparison between the one and the other is instituted. Of interest, too, is the relative suddenness of the change from indefinite pencil-strokes made in imitation of her father's procedure, to relatively definite lines drawn in orderly succession. It seems to mark the passage to systematic procedure; the dawn of ideational process. And it looks like an early example of that insight which comes to us according to the adage in a flash. Presumably in many other ways the child was gaining ideational preparation; and this was almost suddenly applied in the copying.

For a while the reproduction in Professor Mark Baldwin's daughter was limited to two or three copies—objects which she saw him make. That it was now not merely imitation of his movements was evident

from the fact that she did not simply follow them; she looked intently upon the figure which he made, not at his movements in making it, and then strove to copy the figure with movements of her own, very different from his. But she only applied the method of procedure to particular figures, for she could not trace at all an altogether new figure in right lines. Further, she traced these particular figures just as well without the copies before her. Here, therefore, is the rise of tracery imitation of the child's own mental picture—a fact of great theoretical interest. The child had risen from indefinite imitation of the action of her father in using the pencil without reproduction of the figure, to the attainment of such reproduction through imitation of the sequence of his movements, and from this to the reproduction of a mental image retained in memory.

When the ideational and conceptual type of mental process has been established in the course of mental development, imitation is utilised for, and made subservient to, the purposes of the intellectual, moral, or æsthetic life. If a boy in the cricket-field tries to mould his batting in accordance with that of the captain of the eleven, his aim is, through imitation, to become a good cricketer. This is the means he adopts to attain a worthy ideal. Imitation thus contributes to some of the highest and most complex forms of human endeavour. Of this I shall have something more to say (p. 167).

An illustration from the use of language may serve to indicate the stages of imitative process. It is probable that the production of sounds, some of them incipiently articulate, is instinctive in the human infant; and when the sound made by another human being is the stimulus to the production of like sounds we have instinctive imitation. This is the first stage. The second stage is perceptual.

Satisfaction derived from consonance leads to frequent repetition with improved consonance, through the elimination of those factors in the response which lead to failure. But, apart from this, the sounds are perceived to carry meaning, and to be a means of developing certain situations in the field of intercourse. Here we have the beginning of inter-communication with others. Improvement in the use of language follows. Thus we gradually pass to the third or ideational stage, where imitation is subservient to the purposes of the intellectual and æsthetic life. An ideal of accurate and correct speech, with well-modulated and rhythmic sequence and music, takes shape in the mind and forms a model of style. We are constantly on the look-out for excellencies of diction. We frame an ideal of effective speaking or writing, and utilise the imitative process in our endeavours towards its attainment.

It is clear that the careful observation and critical discussion of the phenomena of imitation opens up a wide and fascinating field in the domain of child-study. What are the conditions of its first occurrence? What is its rate of growth? Of what nature are the steps towards more and more accurate imitation? Is the method that of trial and error, with selection of the hits and elimination of the misses, as the imitative behaviour is repeatedly performed? What are the differences among children as to persistency of imitative effort? Some children seem satisfied with poor results; others are not content until the imitation is relatively perfect. What is the relation between imitation and attention? In fostering the former are we not training the child in the application of the latter? May we say that the more concentrated and well-directed the attention the more accurate and adequate is the imitation? Or does the accuracy lie deeper, and depend upon some innate bias in

the constitution to be satisfied with nothing less than the best attainable by reiterated effort? May the strength and persistency of the imitative impulse be regarded as a gauge of, the general mental level, a sign of firmness on the one hand or flabbiness on the other hand of mental fibre? How far is imitation in so social a creature as the child a necessary step to the later development of individual initiative and originality? May we say here, as I think we may say in higher phases of mental life, that the faithful imitation of the best masters is the necessary precursor of independence of treatment at a worthy level of performance? These, and many other such questions, suggest themselves for consideration; as problems to be held in the background of our thought while we are making such detailed observations as opportunity affords on the imitative behaviour even of little children. Every teacher should be a close observer of children. But if our child-study is to be fruitful, it must not only be minute, faithful, and accurate, but must be in touch with broad views as to its bearing on the great and important problem of the development of the human mind.

Since imitation helps to bring the child into line with his companions, its tendency is towards social convergence. But not less important in the field of intercourse is a tendency towards divergence. In this tendency, individualism, originality, initiative, competition, emulation, have their roots. We have no single word which will comprehensively cover the wide range of facts, implying more or less self-assertion, which lie open to our observation in the life of children and adults. *Opposition* has been suggested, and may suffice. In their quite early days we see in young animals and children an impulse to have their own way, to get things from others, to outdo

others, to monopolise for themselves objects and situations which are a source of satisfaction. Such inborn proclivities, while they contain the germs of selfishness, contain also the germs of sturdy independence, and contribute to success in life. They have their biological origin in the struggle for existence under the stress of which those in whom there was no such impulse to self-assertion in opposition to others, would stand but a slender chance of survival. This, too, helps the child as perceptual experience widens, to realise his own powers and limitations always in close relation to the powers and limitations of others. He becomes masterful in this situation, or subservient in that, within the field of intercourse. He learns his own place; and this is one of the valuable lessons of school-life; a lesson which the child, brought up apart from companions of about his own age, fails adequately to learn.

Thus, as Professor Royce has said,¹ "side by side with the social processes of the imitative type appear another group of reactions practically inseparable from the former, but in character decidedly contrasted with them. These phenomena of social opposition have an unquestionably instinctive basis. They appear very early in childhood. They last in most people throughout life. They may take extremely hostile and formidable shapes. In their normal expression they constitute one of the most valuable features of any healthy social activity. This fact may be illustrated by any lively conversation or discussion.

"As a rule, the acts that express this fondness for social contrast, and for opposing one's self to the social environment, are, in their origin, secondary to the imitative acts. It is true that the instinctive basis for them appears quite as early as do the manifestations of the imitative instincts. And since this fondness for opposition is in part

¹ *Outlines of Psychology*, pp. 277-279.

based upon the elemental emotions of the type expressed in anger, obstinacy, and unwillingness to be interfered with, the instinctive basis for the type of action here in question may be said to be manifest even earlier in infancy than is the case with the imitative reactions. But while the instinctive basis of opposition is primitive, the social acts that can express such instincts must be acquired. And in order to contrast one's self with one's social environment, it is necessary, in general, first to learn how to do something that has social significance.³ I cannot oppose you by my speech unless I already know how to talk. I cannot rival you as a musician unless I already understand music. But speech and music have to be learned by imitation. Hence the social reactions which express the fondness for contrast and opposition must, on the whole, follow in their development the social reactions dependent on imitation. This accounts for that close weaving together of the two types of functions of which we have already spoken. The playful child already seizes whatever little arts he has acquired by imitation to express his wilfulness, or to develop his own devices, or to display himself to his environment. And on the other hand, a form of wilfulness or obstinacy, in an already highly intelligent being, may lead to a deliberately painstaking process of imitation, such as happens whenever an ambitious artist devotes himself long to training in order that thereby he may get the better of his rivals. In brief, the preservation of a happy balance between the imitative functions and those that emphasise social contrasts and oppositions, forms the basis for every higher type of mental activity. And the entire process of conscious education involves the deliberate appeal to the docility of these two types of social instincts. For whatever else we teach to a social being, we teach him to

imitate. And whatever use we teach him to make of his social imitations in his relations with other men, we are obliged at the same time to teach him to assert himself in some sort of way in contrast with his fellows, and by virtue of the arts which he possesses."

Both imitation and self-assertion in opposition to others may reach a comparatively high level of development at the perceptual stage of practical experience. But when the child begins to analyse the situations of daily life, to extract from them abstract and general ideas, and to recombine these ideational products in ideal constructions of self, of other selves, of the community, and of conduct as between selves within the community, imitation and self-assertion are caught up into the intellectual, moral, and volitional life. They lose somewhat of that naïveté, that spontaneous simplicity and unaffected ingenuousness, which often lend a charm to the natural behaviour of the unsophisticated child. They are realised as factors in conduct contributing in due proportion to the moulding of life on a settled plan, with a definite purpose, in accordance with an ideal construction. They are regarded as means to a wider end, to be utilised amid the opportunities which the concrete situations of daily life afford.

The nature of ideal construction has already been considered; through the analysis of experience we reach the abstract ideas which are synthetically rebuilt in general conceptions. But the value of these conceptions lies in their application to particular cases on which they shed the light of systematic knowledge. Here we are specially concerned with general conceptions of conduct within the field of intercourse. Now we cannot imitate a general conception; we cannot, indeed, be said to imitate anything which is abstract and schematic; for what we imitate is some concrete mode of behaving. But it is one of the

functions of imagination to embody in concrete form the products of conceptual thought. We can imagine the actual conduct which is based upon abstract and general principles; and we can mould our own actions on those which we picture in imagination as performed by an ideal character under such circumstances as those in which we are placed. We can follow his example as we follow the example of a living person. And this is at any rate in line with imitative procedure. At the perceptual stage a boy imitates the behaviour of that schoolfellow who, without any explicit analysis of his actions, without any conscious reference to the underlying motives, is regarded as the hero; for, just in so far as there is analysis and reference to motives, the boy has passed beyond the perceptual stage. When he compares, abstracts, and selects; when he combines this schoolfellow's conduct in the classroom, that one's prowess in the playground, and the home behaviour of a holiday friend, he is beginning to frame conceptions of an ideal hero whose modes of life are to be his model. Most of us, as rational beings, have thus selected traits of character from many friends and acquaintances, from persons in the realms of history and fiction, and have fused these by the synthesis of thought into our ideal man, whose conduct in any concrete situation we more or less clearly and distinctly imagine. And this embodied product of the imagination, reached by ideational process, is our example of right living. Thus imitation may be contributory to life-conduct in conformity with the ideal, and, as some of us believe, may reach its highest expression in the title of a book which has been found helpful to thousands, and among them not the least gifted of men and women—the *Imitatio Christi*.

Of all ideal constructions, those which involve concep-

tions of character and conduct within the field of intercourse are, for social beings, among the most important. As the teacher must utilise mathematics, geometry, physical science, botany, and other such disciplines to enable the child to frame ideal constructions of the world in which he lives; so, too, must he utilise the whole range of the humanities to help his pupils to reach an ideal construction of the relationships of man to man within the field of human intercourse. His own ministry, as a teacher, must be founded on conceptions of educational procedure which he must apply in daily practice. He has to endeavour to bring into consistent harmony the imitative and the self-assertive impulses—those tending to bring the child into line with normal procedure, and those tending towards individuality and originality. Although both should be developed side by side, and although the impulse to originality should assuredly never be unduly checked, it would seem that the most effective initiative arises from a basis of experience assimilated from the behaviour of others. In other words, on both the perceptual and the ideational planes of mental development it seems, in accordance with sound educational procedure, that imitation should be made the stepping-stone to originality. This fact seems to be somewhat overlooked by some of the extreme advocates of the *heuristic method* of science-teaching. They wisely insist on the paramount importance of practical work and personal manipulation, that is to say, on the development of a sound and workable body of directly correlated experience. Without this, they contend, mere didactic information is of little educational value. So far they are on firm psychological ground. But they sometimes unwisely insist too much on boys and girls being, at quite an early stage, left to themselves that they may discover the meaning and signifi-

cance of experimental work. They preach the doctrine that the mental attitude to be encouraged is that of original research. I question whether this mental attitude is to be reasonably expected at this stage of development. In any case, is not the best avenue to original research that which is opened up through the imitation of the researches of others? In training older students, the best method is to let them work through, and go over for themselves, some line of research prosecuted by an acknowledged master, not in ignorance of the end attained, with a view to rediscovery, but with this end always in full sight, that the steps of the master, also clearly seen beforehand, may be retraced, and that they may learn how to follow such a path. If we look to the life-record of the masters themselves in art, in letters, in science, do we not find that in their early days they were imitators, often slavish imitators, of the style and method of *their* masters? Before they became their original selves they were members of a school—the præ-Raphaelite School, the school of Lake Poetry, the school founded by Liebeg in his laboratory. They climbed up the ladder of imitation before they reached a height which allowed the free use of their wings of originality. No doubt, however, the teacher who possesses tact and judgment will be able so to arrange his course of work as to afford his pupils opportunities of coming into line with traditional modes of behaviour, moulding their methods on those of worthy examples without robbing them of the educational advantage of finding out things for themselves. Unquestionably they ought to be led to discover, and not merely to be informed about, the nature and properties of the substances with which they are dealing. But it is through imitation that the child in early life learns so much about the world; and what we have to do in the laboratory is

to set the boy on the more or less beaten track, so that by doing as others have done he may find out for himself what they have long ago discovered. His interest in his own personal discoveries is quickened by the sense that he is participating in the like interests of others.

Little has been said above on the characteristic affective tone which arises within the field of intercourse. Let us review some of the salient facts in this connection, remembering that what we term interest is a form or mode of affective tone. Quite early in the course of his development the child takes especial interest in the doings of others. He comes of a social race. He is ushered into a world in which mother, father, brothers, sisters, and other human folk play a quite peculiar part. The experience he gains of them differs from that which he gains of inanimate objects, and even his experience of inanimate objects is gained side by side with them, and has meaning and interest not for himself alone, but for his companions and associates in conjunction with him. The imitative tendency, as we have seen, gives ample opportunities for community of experience, and helps the child to enter into the heritage of traditional modes of procedure. He does things after others, and with others, and gradually realises that their experience is like his and his like theirs. He has his tussles with others, takes from them their favourite toys, has his own snatched from him by them. He wants what they want, and gets it himself or sees them get it. In a thousand ways he shares their life and feelings. In a thousand situations there is community of interest. And community of interest as developed by intercourse is suffused with the affective tone of *sympathy*.

From a slightly different point of view, we may say that *sympathy* is the affective tone accompanying gregarious

behaviour. It is one of the instinctive tendencies of human beings to make common cause and unite with their fellows in the prosecution of similar ends. And the instinctive tendency is supported by all the practical teachings of intercourse. It is effective, when isolated action and effort fails: it leads to the completion of situations which would otherwise remain incomplete: it brings with it the satisfaction of corporate success, instead of the mortification of personal failure. And in that satisfaction there is social reinforcement which raises it above the individual level. Thus personal interests in the related experience are strengthened by sympathetic interests due to the added relationships of mutual endeavour. Intercourse raises affective tone to a higher level. And if it be true that the spontaneous impulses of perceptual life lead the flow of consciousness towards the completion of the most pleasant situations, it must be remembered that for social beings half the pleasure of the situations begotten of intercourse is due to the incorporation of sympathetic interest.

In any group of boys and girls there is, too, a certain amount of internal regulation of interest and endeavour. In the play-situation divergencies from the common aim are visited with unpleasant consequences. If they are carried too far, the offending party is excluded from the field of intercourse, and becomes an outsider, out of touch with the social interests of his companions. And nothing can show more clearly the important part played by sympathetic interest in the development of affective tone, than the effect generally produced by such exclusion from the field of play-intercourse. Or if there be anything which shows the force of sympathy with equal clearness, it is the heightened endeavour and added zest of those who win the admiration and glad support of their com-

panions, and become leaders in the situation and proud centres of the field of intercourse.

If we turn from the narrower field of the play-situation to the broader field of the school at large the internal regulation within the groups of pupils is supplemented and extended by the external regulation emanating from the masters and mistresses. And if in their wider sphere of intercourse the teachers are differentiated from the taught, there must also be the integrating bonds of sympathetic interest. The teacher must not stand aloof in the proud isolation of his more advanced intellectual or moral system, proclaiming abstract principles *ex cathedra*, but must step down into the arena of the practical situations in which alone his pupils can at present move with ease and freedom. He will here find the body of practical experience, including that begotten of intercourse, which will afford abundant data from which he may select the materials on which to found the beginnings of a system of conduct, and by means of which he may lead up, by easy steps, from the sympathetic impulses which form part of the affective tone of perceptual behaviour, to the motives on which truly moral and volitional acts are founded. For here, as elsewhere, he must constantly bear in mind what may be regarded as the cardinal maxim of educational development. Always proceed from concrete situations to abstract system, and never let abstract system outrun too far the practical situations on which it is its function to shed light. It is of little avail to preach the higher abstract morality, applicable to the more complex and difficult situations of adult life, when the simpler circumstances of school intercourse have scarcely risen above the lower level of perceptual treatment in the light of the sympathetic impulses of the passing moment. The wise teacher

will find within the limits of school intercourse, the concrete embodiment in practical form of two leading principles which form the conceptual foundations of all moral endeavour, the ideal self and the ideal community. The situational embodiment of the ideal self is hero-worship: the ideal community is the school as it is, or as it can be made by its heroes and the lesser folk who look up to them for guidance. Schoolboy ethics and the schoolboy code of honour are sometimes quaint products of the beginnings of system. They lack refinement, they exhibit strange distortions, they have a touch of barbarism. But it is just here that the influence of the sympathetic teacher can make itself felt—not by running directly counter to the inherent tendencies of schoolboy situations, but by insensibly adding here a little and there a little to their refinement, by gently but firmly repressing the distortions, and by subtly introducing into the concrete situations of school life the elements of a higher civilisation. A great change has come over our public schools within the last half-century. The masters mix more freely with the boys, enter more fully into their out-of-school life, and are in closer touch and increased sympathy with their development outside the walls of the classroom. And now it is more true than it was fifty years ago, that the tone or “good form” of a school is a joint product of the sympathetic intercourse of teachers and taught.

But apart from the practical situations of the daily life of the school as a social community, much of the class-work has, as before mentioned, an important though incidental bearing on the development of a system of conduct. And on this ground, if on no other, a due share in the curriculum must always be reserved for the humanities. The concrete situations portrayed in literature and history (and in the early stages of education they should be

developed frankly as pictured situations, without as yet attempting to pry into their deeper significance) — these concrete dramatic episodes, what are they but representative extensions of the field of intercourse? Through them it is the business of the teacher to minister, quite as much to the affective development as to the cognitive development of the young. Of course here, as always, the affective tone is the accompaniment of cognitional assimilation. But the relational links of interest are suffused with sympathy. The teacher must elicit the sympathies of his pupils with the actors in the literary or historical drama, and must subtly show the trend of his own sympathies for their guidance in right and wholesome directions. And the pity of it is that for purposes of examination the affective aspect, which educationally is of such great importance, drops so much into the background. What has been assimilated as so much knowledge can be readily tested. The relational links to the body of representative experience, or the system of historic thought in their cognitive aspect, almost inevitably count for more than the worth and quality of the affective tone which suffuses them with sympathetic interest. And yet this is what gives to literary and historical studies in school life their chief educational value—a value which it is difficult to over-estimate.

There is one more question to which, since it is implicated in affective development within the field of intercourse, some reference must here be made. What part should rewards and punishments take in that development? Ideally, sympathetic approbation should be the only and sufficient reward; disapprobation the sole and sufficient punishment. But, to take first the question of rewards, they may perhaps be regarded as practical and

concrete embodiments of approbation. Still we must be careful, in that case, that they are regarded merely as such symbols of approbation, and not as ends in themselves. Parents who have so acted that their children are always looking for the reward, are likely to find their course beset with difficulties. Without the expected reward as an incentive the child will be pitifully inert, if not refractory. And in school life, for classwork well done (or perhaps more often for fortunate endowment) rewards in the form of prizes and the like are often regarded as necessary incentives to the output of endeavour. They must, however, be looked upon as merely temporary expedients to supply an extraneous element of interest which may supplement that of winning knowledge and position. If the work of school life is only the beginning of, and the training for, the work of after life, there is at least some danger lest the studies prosecuted for the sake of a prize should be discontinued when the days of prizes are past. And if it be said that the prize-winners are generally those who would have won the same position from intrinsic interest apart from extraneous inducement, is not this tantamount to saying that, after all, the prize-reward is unnecessary? On the other hand, prizes may perhaps be regarded as the concrete symbols of approbation, and valued as such. Still, working for prizes is somewhat analogous to playing for money. And many of us in our hearts admire more the man who plays for the game, and the lad who works for the system of knowledge, than the man who plays for the stakes or the boy who strives for the prize—both, be it understood, under the sympathetic conditions of intercourse. To win is a worthy object of ambition—but not of necessity to win the stakes or the prize; rather to win knowledge and to gain sympathy and approbation.

Turning now to the obverse side the picture, I repeat

that, ideally, disapprobation should be the sole and sufficient punishment. But the ideal system requires ideal material; and the raw material of human nature, as given in children, seldom meets the requirements of the teacher's ideal. Hence disapprobation must often carry with it a sting which shall act as a deterrent to the completion of situations which seem unsatisfactory to the parent or teacher, and which in a few years will seem equally unsatisfactory to the patient. Many of us, in looking back on our early days and on our relations with those set in authority over us, have cause to be profoundly grateful for some, at least, of the punishment which we then incurred. We now realise that without this bitter medicine our mental and moral health would not have been preserved. Personally, I have met many men and women who have expressed regret that punishment was not inflicted on them more often and more severely: I have encountered but few who could honestly say that they would have been the better without the share that fell to their lot. And in these few cases what has seemed most sorely to rankle has been the hard and unsympathetic attitude of one who inflicted punishment rather from love of it than from love of them. Into the delicate questions which must arise out of a discussion of the exact form or forms which punishment should take, I cannot attempt to enter. But as a guiding principle I would suggest the maxim: Never punish unless you are quite sure that you will deserve, if you do not get, the thanks of your pupils when they come to years of discretion.

CHAPTER VII

LANGUAGE AND THOUGHT

THE most obvious function of language is to afford a means of intercommunication within the field of intercourse. It is clear, however, that such communication can only be an aid to, or the supplement of, the experience and knowledge of the hearer. In other words, it must be received, subject to the psychological conditions of assimilation. It must always be in touch with the things with which it deals and with the thought which it serves to express.

A second function of language, closely connected with the first, is that it forms a medium of record. This, of course, in its full development requires the use of written or printed characters. It thus indefinitely extends the field of intercourse and enables us to hold communion with those who are absent, to profit by the experience and knowledge of our predecessors, and to hand over to our successors an enriched heritage of thought. Of that thought it is an expression; and as embodied in language thought is brought under control. This is so important that it may be regarded as a distinct function of language. Words are the concrete symbols of abstract and general ideas. As concrete they serve to hold and direct attention; in their synthetic combination they constitute an art-product which can be moulded and fashioned at will. Through language thought can be manipulated. *When

we remember that control is primarily and distinctively exercised over motor activities, and that all spoken and written language is an application of such activities, it is clear that when images and ideas are symbolised by words they are brought indirectly under a control to which they are not directly susceptible. Primarily developed for purposes of oral communication with others, language becomes also a personal possession of great value, as both the tool and the material by the use of which the processes and products of individual thought can be rendered more shapely and systematic. Articulation may be suppressed to an inaudible whisper, and thus pass into an internal process, over which, however, we still retain full control as we think in words. And when the spoken word is recorded in written symbols, our powers of manipulation are increased. We can strike out redundant expressions, insert here, transpose there, recast in many ways, and mould our thought as we would mould a piece of plastic clay. Herein lies part of the educational value of essay-writing.

Furthermore, since language is a social product, through its use we more fully realise that our own experience and the experience of others are of a similar kind. Thus a conception of the unity of human thought, and a corresponding reference to a common universe of discourse is fostered. Language helps to remove what philosophers have termed "the fundamental isolation of the individual mind," and yet tends to render clear the individual identity of the speaker. For the uttered word carries a treble reference: to the object of experience or thought to which it applies; to that which it implies to us individually; to that which we conceive it implies to another. Here, again, we have the concomitant development of notions of self, of other-self, and of world. Lastly

language is an indispensable aid to the processes of analysis and synthesis, through which we attain to ideal constructions. As Dr. Stout,¹ who has done much to emphasise the psychological importance of this aspect of language, says: "Intercommunication of ideas implies analysis of the objects and processes presented to perception into certain constituents which recur in varying combinations in various particular cases. The use of language, therefore, involves the analysis of objects into common factors, and their free reconstruction out of these common factors." Thus not only is language a means of communication and a medium of record, but it is also the agency through which the thought that is thus communicated and recorded can be further developed.

There is one more function of language, which is of the utmost importance. It contributes largely to the affective and æsthetic development of our mental life. We are thus introduced to the literary aspect of language. In this chapter little will be said thereon. But it may be well to remember that, when this rises to its highest pitch of excellence, the subtle music of speech is combined with not less subtle harmonies of thought, and that both expression and thought are in close touch with the realities of existence within the selected universe of discourse. And the teacher who is helping the child to frame correctly the simple sentences in which he expresses his naïve experience, should from the outset keep in view the ultimate aim that, at its best, language should be a beautiful embodiment of justly related thought, disclosing the essential nature of the world and of human life with all its varied products.

Can we think without words? This question is often

¹ *Manual of Psychology*, p. 478; cp. the chapter on Thought and Language in Dr. Stout's *Analytic Psychology*, vol. ii. p. 190.

discussed. It should, however, be subdivided into two questions. First, can we now carry out thought processes, frame or apply ideal constructions, without verbal symbols? To this question we must give an affirmative answer. We can think out new moves in chess, invent new machines, solve geometrical problems without naming the essentially new features. Pictures or images are in this case the concrete embodiments of our thought. They stand for or embody general notions; and they do so more especially where perfectly individualised connections in time and space are before our mental vision. But the further question remains behind. Could we reach the level of thinking at which such procedure obtains in the absence of language? The answer must be conjectural. We have not the data to enable us to give a decisive opinion. As a matter of fact, however, mankind has reached its present level of knowledge with the assistance and partly through the instrumentality of language. It is difficult to conceive that man could have reached his present level of thought in the absence of language. We must remember, also, that not only are words the expression of certain reactions we have acquired when we were in social relations to our fellows, but that all our thought has likewise been developed in the midst of such social relationships. Thought, no less than language, involves a process of give and take. "If we once understand," says Professor Royce,¹ "how these social relations determine that character of our consciousness which essentially belongs to all thinking, we become able to see why verbal associations and habits should be so prominent in connection with all the thinking processes. We shall also be able to see what is frequently neglected by psychologists, namely, the possibility that processes of

¹ *Outlines of Psychology*, p. 280.

thought should, on occasion, appear dissociated from verbal expression, though never dissociated from tendencies to action which have a social origin essentially similar to that of language." If thinking be a social function, and the use of words be also a social function, and if these two social functions are continually interacting, the probabilities are that they are closely connected, even if some of our thinking may now be effected without verbal symbols. In any case, however, normal educational procedure is dependent on the establishment of intimate relationships between things, thoughts, and words.

How language first originated we need not consider. It now, without question, forms an essential part of the child's environment with which he has to come into vital touch through processes of assimilation. But this part of his environment is itself an expression of the experience gained in the field of nature, among the products of human industry or ingenuity, and through social intercourse. The child's apprehension of the meaning of verbal expression is gained along with, and nowise independently of, his experience and knowledge of the nature of things and the doings of persons around him. At this stage the question never arises whether the child should learn about things and processes, persons and their behaviour, in the midst of concrete situations, or about words and sentences, language and speech. The latter without the former are sounds without meaning. In all phases of perceptual development, practical experience and verbal description should be linked together as closely as possible. There should still be no question whether the boy is to deal chiefly with words or things; he should always be dealing both with concrete objects and their verbal symbols. At a later stage, when language becomes more consciously and explicitly the expression of the

systematic knowledge, the pupil's understanding of the one should go hand in hand with his comprehension of the other. Language must not be allowed to out-run thought; nor thought to lose touch with the concrete phenomena with which it deals. A discipline in language, a discipline in the thought of which that language is symbolic, and a discipline in the application of both thought and language to what lies within the range of experience, are so closely related that they should be regarded as diverse aspects of one educational discipline.

Let us, however, go back to the beginnings of speech in the little child. At first the sounds which are to become the names of things are simply associated with salient features in a concrete situation. But the association is of a peculiar kind. It involves a correlation of occurrences within, let us say, the field of sight and the field of hearing. The sound within the latter is a factor of a disposition predominantly visual. And though associated with the object, it is not a constituent part of that object as such. It does not belong to the object in the same way as the barking of a dog or the mewling of a kitten belongs to them. There is indeed from the first a cross-association, foreshadowing the essential characteristic of language as significant *of* something *to* someone. In the child-mind the sounds which carry meaning are associated both with the objects indicated and the person, mother or nurse, who indicates them. This attachment to, and yet at the same time detachment from, the objects renders the word-sound peculiarly fitted to call up the relevant portion of the body of experience for purposes of assimilation. And this is more markedly the case, since the same sound is associated with slightly different impressions, varying somewhat in slightly different situations.

At first the sound-words associated as factors within a perceptual disposition have a merely indicative or suggestive value. They are directive of the attention. They give rise to expectations; and each has its primary value in presence of the object by which the expectation may be realised. So long as they remain at this merely indicative stage their use and force is restricted to the here and now within a given concrete situation. It is impossible to convey by associative word-sounds, as such, what has been the experience of the past or what will be the experience of a future beyond the immediate situation. And the words the child himself first uses are indicative of some present phase of its perceptual experience. They are as yet neither analytic nor synthetic. When the child says "Up," for example, that sound is an indication of a felt want, and of the expected development of a given situation in a certain manner. It is not a "part of speech"; for as yet there is no speech to be analysed into functional parts. Nor is it an elliptic sentence; for the sentence is also as yet unattained. It is just an indicative sound which is associated in perception with a bit of unanalysed experience.

And it is an indication of a mode of experience full of affective tone. It is sometimes said that the whole vocal life of infancy is primarily an expression of feeling. This is true enough if we steadily bear in mind that with all feeling there is also a cognitional aspect. In the child the feeling-aspect is emphatic; and the word-sounds are expressive of wants and needs,—of these we may even say primarily. But there is always also an incipient cognitional reference to that which is wanted, or that which will satisfy the need. At a later stage this may acquire the greater emphasis; until words come to symbolise the objects of our experience or of our thought.

A connecting link between the stage of indicative communication and that of descriptive communication, when the child is beginning to talk in sentences, is afforded when he puts together in juxtaposition two sounds indicative of different aspects of sensory experience. When the child uses together the two sound-words "Bow-wow bark" he is on the verge of, if he has not actually reached, predication. Let us suppose that the juxtaposition of sounds is merely an expression of the association which has been formed between the auditory and the visual factors in a coalescent percept. Even so the separate sound-words must soon beget the analysis into the dog that barks and the barking of the dog, and their synthesis in the form of a judgment. The relation implicit in the barking dog is rendered explicit through the incipient proposition. And when once the child reaches this stage of dawning judgment there follows a period of marked and rapid progress, due partly to the employment of a new and increasing faculty, partly to the extension of intercourse thus rendered possible, and partly to the fact that his teachers thus acquire a fresh leverage to lift him up in his onward course of development.

It is not necessary here to dwell on the fact that imitation is constantly operative in the early stages of the use of language. Nor is it necessary to trace the genesis of simple sentences in the incipient speech of children. It is worth noting, however, that they come to the lips of the child in the absence of anything like set and formal teaching. That is one reason why, when such set and formal teaching begins, we should start with the sentence and not with individual words or "parts of speech." The parts of speech are analytic products, and should be reached by analysing the whole of which they

are parts. As we have seen, the stages of psychological development are roughly as follows: first, the correlation of the data of experience into perceptual wholes suffused with meaning for some form of practical behaviour; secondly, the analysis of the perceptual whole into its several constituent factors or those which are of leading importance; and thirdly, the re-synthesis of the analytic results into an ideal construction. Thus starting with the naïve whole of perceptual experience, we reach by analysis and synthesis the corresponding conceptual whole of ideational thought. The sentence, as it lives in the mouth or on the ear of the child, is similarly a naïve whole of relatively perceptual experience. With this we start. By analysis and synthesis we reach the corresponding conceptual whole of the sentence as intellectually grasped.

Are we, then, justified in regarding the sentence and not the word as the unit of language? I suppose the answer to this question depends upon the point of view and the purpose in hand. When we have occasion to employ language in speaking or writing there is some more or less definite topic on which it is our purpose to discourse. In the give and take of conversation and of classwork the topic is developed by means of the discourse. Logically, it is convenient to regard the proposition as the primary unit of language, expressive of a judgment as the primary unit of thought. Of course the proposition may be analysed into words, and the judgment into ideas. These may be regarded as derivative units or analytic elements. It must be remembered that what we term a "unit" is just an arbitrarily selected factor; and what is taken as a unit depends entirely on the purpose in view at the moment. The word is what it is only in reference to the proposition of which

it forms a constituent part; so, too, the idea only lives and moves and has its effective being as a factor in some judgment. I take it that in regarding the sentence as the unit of language we have in view constituent parts, each of which is or may be self-contained. In a train, the engine, coaches, and guard's van are the constituent units, each of which is a going concern in relation to the others. The wheels and axles, doors and hat-racks, are rather parts of a carriage than parts of a train. We have changed our point of view. A judgment is in itself a significant unit of thought; the terms only have significance within the judgment.

Now the precisely worded proposition, and the judgment clear-cut in thought, are ideal constructions. Implicit in the language employed in daily life and in literature; they are rendered explicit in logical form. They are re-syntheses for logical purposes of the more naïve and informal syntheses of common speech. As such, it may be said the schoolmaster has little concern with them. But the teacher who is to minister to the most effective use of language should be fully aware of the logical implications. Formal logic may indeed appear to him a crabbed discipline, without obvious bearing on his life-work. But the essentials of logic are of value to the teacher of even the most elementary subjects. And it is eminently desirable to combine the logical point of view with that which is more distinctively grammatical.

It would appear to be in accordance with sound method that the first step in the analysis of a sentence should be one which leads up to the logical distinction between subject and predicate, though not yet expressed in strict logical form. On the one hand there is what is spoken about, the point of departure of our thought; on the other hand, what is said about it, some further development of

our thought. Suppose we are planning an afternoon walk, and in response to a question, say: "Three o'clock is the time of starting." I take it that, notwithstanding the order of the words, the time of starting is the subject and three o'clock the predicate. The latter is put first for emphasis. But it is well to place the subject first. If I say that the cube of 3 is 27, the cube of 3 is already in mind, and 27 is affirmed to be the result which will be reached. But if I say 27 is the cube of 3, the whole number is in mind, and the assertion is that for the purpose in hand it may be resolved into 3^3 . In a different connection it might be resolved into $26 + 1$, or $32 - 5$. We must always remember that a statement is made or a sentence uttered for the furtherance of some end. As contributing to that end, each implies the other, in the sense that without the other it is incomplete. When this is fully realised, and it is quite clearly grasped that the sentence is the synthesis of the two, the ideational standpoint is reached. No doubt in some sentences, those, for example, which express a command, the synthesis is not quite obvious. But if the teacher says, "Stand up and recite," the child will understand that the teacher's wish is the unexpressed but implied point of departure, and the act of recitation the development.

A further step in the analysis of the simple sentence discloses a distinction, in what is spoken about, between the subject proper and its enlargement—that is to say, sundry attributive adjuncts which serve to define or limit the subject. In the sentence, "The beautiful princess, with a blush on her fair cheek: shyly gave the noble knight a blue forget-me-not," the part which precedes the colon is what is spoken about; and within it the subject "princess" may be analytically distinguished from its limitation to "the" princess, and the statement of one

of her attributes in the word "beautiful." It may sound paradoxical to speak of the "enlargement" of the subject as playing a limiting rôle. But an enlarged or extended statement may, and very often does, limit or restrict the thought suggested by the subject. Princess by itself may stand for any princess; technically it is "universal": the enlarged statement restricts our thought to the beautiful princess of the story. So far we are looking at the matter from the logical standpoint, and considering what is signified. But concurrently with this we may classify the words used according to their function, and thus take up the point of view of grammatical analysis. In a similar way we may deal with the part of the sentence which follows the colon, what is said of the subject, the logical predicate. We distinguish the predicate verb (termed the predicate in the analysis of sentences); its completion by the direct object "forget-me-not," and the indirect object "knight"; sundry enlargements of these defining or limiting them; and an extension of the predicate verb by the use of the adverbial adjuncts which serve to define or limit its application. Here, again, we are considering the significance of what is said; but here again we may concurrently parse and render clear the grammatical functions of the words that are used. It forms no part of my purpose to discuss the analysis of sentences, simple, complex, and compound. This to the teacher is or should be quite familiar ground. I beg him, however, to remember that he should make to himself quite clear the psychological and logical function of all the parts, whether separate words or clauses, or subsidiary sentences, as expressive of thought, and bring these into relation with their grammatical functions. What he has to bear in mind is—(1) that (logically) the sentence conveys some information

—applies to some universe of perception, knowledge, or imagination; (2) that it (psychologically) implies certain thought processes; and (3) that it is expressed in language under the rules of grammatical form. There are therefore—(1) relationships among the objects of thought; (2) relationships among the thoughts of these objects; (3) relationships among the words or clauses expressive of this thought; and (4) complex cross-relationships between those which fall severally under the first three headings. It is because the analysis of sentences properly conducted affords such a varied discipline that it possesses so high an educational value. It may be so treated as to be replete with interest; but, no doubt, it is not infrequently so treated as to be amazingly dull.

In the more strictly grammatical part of his work the teacher must never forget that, as Dr. Bosanquet says,¹ “the grammatical analysis which classifies words as substantives, adjectives, adverbs, verbs, and the like, is not to be taken as telling us what words are by themselves, but just the opposite, namely, what they do when employed in a significant sentence. They are studied separately for convenience of attending to them, as we study the wheels and pistons of an engine: but the work which gives them their names can only be done when they are together.” That is one thing to remember. Another thing is, that we must let our rules grow inductively from the examples as they occur in the living world of language; not at the outset formulate the rules and then set forth on the quest for illustrative examples. That may be done later. The rules are generalisations from particular cases. They are ideal constructions, and are framed by comparing an adequate body of data, and

¹ *Essentials of Logic*, p. 85.

reaching by abstraction the essential features common to all the cases. In other words, preparation and varied presentation must precede generalisation. Then application may follow, and the rule may be illustrated by further examples, which may be apperceptively assimilated. One may, perhaps, go so far as to say that the child should not be allowed to see a grammar until his powers of grammatical apprehension are such that he is beginning to have confidence in them, nor until he has reached, under due guidance, a number of generalisations for himself, and can see how they are reached. Then he may use a grammar, but even then chiefly as a book of reference—one to which he may turn, not from which he must learn by heart certain rules.

When a foreign language is added to the mother-tongue further opportunities are afforded for that comparison which is so helpful in disentangling the universal rule from the concrete example. In educational value for this purpose (that is to say, wholly independent of its literary worth) there is no question that such a highly inflexional language as Latin stands far higher than modern languages. Indeed, we may say that the comparative study of an analytic language like English, and an inflexional language like Latin, is essential for the best training in the apprehension of grammatical relations. In the inflexional language each word bears on its face the sign of its relationship. "*Magister pueros docet.*" The subject is here clearly indicated and marked off by its termination from the object as complement of the predicate. The time-relation is also clearly shown in the form of the verb. In English, though we still retain some inflexions, we as a rule indicate the relations either by separate words or by position in the sentence. While in Latin we say "*docet,*" "*docuit,*" "*docebat,*" or "*docebit,*"

the verb itself showing the time-relation, in English we say "teaches" and "taught," so far like the Latin, but "was teaching" and "will teach," here using separate words to express the time-relation. In Latin, as in English, the grammatical analysis should, so far as is possible, be made a matter of direct apprehension in the sentence, not a matter of rules learnt by heart in the grammar. The headmaster of a grammar school tried, for a term, the experiment of giving no grammar work from the book, but taught his form to exercise their faculties of apprehension on the grammatical relations as they naturally arose, and to generalise the results they thus obtained. At the end of the term he set an old grammar paper that had done duty from time to time at befitting intervals; and though the form was nowise above the average, the grammar papers the boys sent in were distinctly above the average. It is, from the grammatical standpoint, as a means of training the faculties of comparison and generalisation, that the study of such a language as Latin side by side with English is so valuable.

To return now to the more distinctly logical standpoint, even a simple sentence contains by implication a number of propositions. The princess is beautiful; the knight is noble; the forget-me-not is blue; and so forth. By breaking up complex statements into the definite propositions which they contain or imply, the judgments are rendered explicit. This brings us back to the nature of the ideal constructions of logical science. Logic analyses a proposition into subject and predicate, connected by the copula (*is* or *is not*), which is merely the symbol that the two are brought into synthetic relationship. It stands for the attitude of acceptance underlying the judgment. It is simply the recognised

mode of expressing in a proposition that there is a judgment, or again it is a sign that subject and predicate are distinguishable but connected factors in a given whole. In the ideal constructions of logic the statements made in complex sentences are broken up into a series of propositions, each expressing a single judgment, and each in the present tense. The grounds on which the judgments are made, and their connection and dependence on each other, are thus rendered clear.

The child's earliest affirmations and judgments arise directly out of his perceptual experience. Each expresses some aspect of reality in and for that experience. Each is made in relation to some interest of the moment. Each implies that others, to whom the affirmation is made, have like experience. And each implies also the assimilation of the present experience to that before gained under like circumstances. When the child says "I saw a mouse," or "I shall pick buttercups," reference to the past and expectations of the future become explicit. But each statement expresses an aspect of reality within this time-reference. It may sound pedantic to say: "The nature of reality is such as to include my seeing a mouse yesterday," or "is such as to include my picking buttercups this afternoon." I do not suggest that the teacher should talk like this to a class of children. None the less it may be well for him to realise that every judgment is concerning the nature of reality in some universe of thought, and that for the purposes of the ideal construction of logic all historical statements (for example) can be thrown into the present tense by making reality the subject of a predicate with historical reference. This brings out the attitude of acceptance in the name of reality, symbolised by the copula. Not until the child realises that, in saying that

he has seen this or done that, he is affirming something of reality, does he begin to grasp the distinction between fact and falsity; and not until he realises that the falsity may be accepted by the hearer as an affirmation concerning the nature of reality, does he grasp the distinction between truth and falsehood.

What, however, it may be asked, is meant by reality? It may sound almost absurd to say that statements made in the fascinating story of *Jack and the Beanstalk* are affirmations concerning the nature of reality. But from the logical standpoint reality is to be understood as that which is essential to self-consistency within some universe of discourse. It may be the universe of the natural world, or that of history, or that of physical conceptions; but it may also be that of Shakespeare's *Hamlet*, that of Thackeray's *Pendennis*, that of *Jack and the Beanstalk*. Some presentation, backed up by an interpretation within its appropriate universe of discourse, is what is here to be understood by reality. I take it that the child often fails to distinguish the different universes which for us are distinct enough, for example the universe of historical fact and the universe of imagination. And this sufficiently accounts for some of the so-called lies of little children.

The proposition then makes an affirmation concerning the nature of reality. Distinguishable aspects of experience or of knowledge are connected by the copula in the expression of a synthetic judgment. Let us, however, be quite clear as to the analysis and synthesis involved in the apprehension of a comparatively simple descriptive sentence. It helps us more fully to grasp the connection between perceptual process dealing with concrete experience, and ideational process dealing with ideas and concepts, having universal application within their

appropriate spheres. If we say to a child, "Mother saw a black cat in an apple tree at the end of an old garden," the words must pass through the lips and enter in at what John Bunyan called the ear-gate single file. The child, if he had been at his mother's side, might have taken in the whole situation at a glance. To describe it, however, the whole experience must be broken up into constituent factors, which have to be expressed serially. They can be expressed in no other way; such is the nature of language. This inevitably involves analysis, but if the description is understood the constituent factors must be combined to form a whole of representative experience. This inevitably involves synthesis. Ideational thought renders the analysis and synthesis explicit.

What, we may now ask, is the force of the term "universal" as applied to words? Take, as an example, the black cat in an apple tree. There are an indefinite number of black cats in the world, and an indefinite number of apple trees. The words, as such, will apply to any black cat and to any apple tree. The technical term "universal" implies this wide range of application. If images are called up they are representative of the universe of black cats and the universe of apple trees. The extent of the universe of application varies. The term "cats" has a wider application than "black cats" the term "trees," than "apple trees." The qualifying words introduce differences which serve to limit the application. Incidentally, therefore, these phrases involve the principles of classification. Technically, "cats" and "trees" name the *genus* of which "black cats" and "apple trees" are *species*. In the sentence addressed to the child even the word "mother" is a universal. By itself it applies to any mother: there is nothing in what

is actually expressed to limit the application; but the conditions of the moment do practically limit the reference to the child's own mother. Even so, however, the name is in a sense universal. The child has had a great number of diverse experiences of mother; as a term referring to the centre of all such experiences, it embraces them all. It does not in itself apply to mother sitting indoors with baby on her knee, mother dressed for a dinner party, mother in her evening-gown kissing "good-night." The conditions of the sentence suggest mother in her afternoon attire, walking in that garden and catching sight of that black cat—that is to say, the universe of own mother under the particular limitations of a concrete situation.

We thus see in what sense it may be said that the words in daily use are universals, and also in what way they find their particular application. Adjectival adjuncts serve in some degree to limit them, restricting their universe. But above all, the specific conditions of discourse, and the existing circumstances under which names are uttered, not infrequently give the universal a quite particular application—as in addressing the sentence above considered to a child, when "mother" is not only limited to *his* mother, but to his mother in a definite situation. If I speak of a "blackboard" the universe of "board" and of "black" mutually limit each other. This may be illustrated diagrammatically, by intersecting circles thus—



the shaded part showing the limited universe of "black-board." Under the conditions of the schoolroom this is further defined as the kind of blackboard used therein. And I may further particularise by the use of the word

"this." Even "this" as a word is a universal. It may be applied to this book, this ink-stand, this "anything." But under given circumstances it brings the conceptions embodied in language into touch with perceptual experience.

It will be remembered that in the first chapter the nature of ideas as general, as involving abstraction, and as free to enter into new combinations, was illustrated by that which answers to the word "clock." Now "clock" implies certain essential characters. The central idea is that it is a kind of timepiece. But it applies to a great number of objects, some one of which may be actually perceived, or re-presentatively imaged. Let us now bring this into connection with the distinction drawn in logic between the denotation and the connotation of names. "A term's denotative function is to be the name of some thing, or some multitude of things, which are said to be called or denoted by the term. Its connotative function is to suggest certain qualities or characteristics of the things denoted, so that it cannot be used literally [as opposed to figuratively] as the name of any other things; which qualities or characteristics are said to be implied or connoted by the term. . . . When, for example, we apply to anything the term 'sheep' we imply that it has certain qualities: 'sheep' denoting the animal, connotes its possessing these characteristics."¹ As Dr. Bosanquet² puts it, "The denotation of a name consists of the things *to which* it *applies*, the connotation consists of the properties which it *implies*. . . . In short, the denotation of a general name is simply the meaning of its plural or of its singular, in the sense in which it implies a plural, while the connotation is the meaning *per se*, not considered in its instances.

• ¹ Carveth Read, *Logic Deductive and Inductive*, pp. 29, 36.

² Bernard Bosanquet, *The Essentials of Logic*, pp. 88, 90.

. . . It is clear, then, that every name has these two kinds of meaning—first, a content, and then instances, whether possible or actual, of the content; and the two are obviously inseparable, although they are distinguishable.”

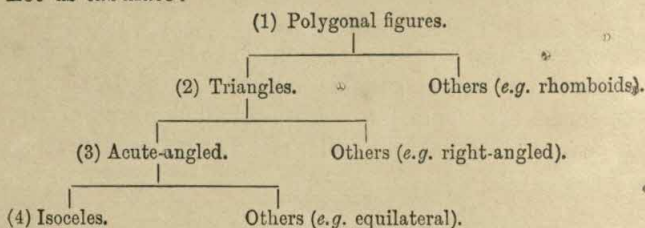
The connotation of the name being thus what it implies, the purpose of *definition* is to express the essential core of connotation for some purpose in hand as briefly and accurately as possible, making clear the significance of the idea or concept for which it stands. Precise definition is, however, a late product of our thought when it comes to logical maturity. We should not attempt to define to a child the connotation of the common names he is beginning to use with freedom and ease. So near the level of practical experience we should, as a rule, when he is puzzled, resort to denotation; in other words, we should probably direct the child's attention to the objects to which the name by common consent applies. At the perceptual stage of development it is through behaviour that things acquire meaning; and words, at first, are symbolic of such meaning. They imply in the first instance something which he can do with the objects they name, or something which they can do to him. This he may be able to describe long before he reaches the stage of exact definition. And presumably the majority of us would find it a hard task to define all the names we use in any five minutes of the ordinary conversations of daily life—if indeed it were worth while. We are not then moving in the universe of discourse,—that of rational argument,—in which the strict definition of each individual term is in place. The meaning of words and phrases in the familiar speech of daily life is rendered sufficiently clear by the context. This shows that we can say what we mean, and understand what others tell us, without making clearly explicit to our thought the exact significance of every

word. As a matter of fact we do nothing of the sort: we just grasp the net result of what is said, and present like net results in customary phrases. It is only when we reach the level of precise systematic knowledge—that of clear and concise reasoning, cogent argument, and logical proof—that the definition of the terms we employ, or a sense of confidence that we could define them if necessary, is essential.

Discipline in mathematics, geometry, and physical or biological science involves the definition of terms. Without having learnt any formal rules the boy can define, more or less accurately, petal, insect, sulphide or phosphate, energy and momentum, a straight line or a triangle. He can tell us that a triangle is a figure bounded by three straight lines and containing three angles. This, of course, is a plane triangle—but, if spherical triangles have not yet been considered, the term triangle for him is the plane figure. Logically, the words “containing three angles” form, I take it, no essential part of the definition. It is a *property* of figures bounded by three straight lines to contain three angles. Properties are not expressed in a definition; but they may be inferred or derived from what is so stated. It is a property of triangles that the three angles are equal to two right angles. If we define an equilateral triangle as one in which the three sides are equal, it is a property of such a triangle that the three angles are also equal. But we might, with equal accuracy, define in terms of the equality of angles, in which case the equality of the sides would be a property. An *accident* is an attribute which is neither connoted by the term nor such as can be inferred from its definition. Sometimes accidental qualities are common to a whole class, but if they are not included in the definition nor implied in it as properties, exceptions to their universal

occurrence may be found. All the metals known a hundred years ago were heavier than water; but though this is an accidental quality of most metals, potassium, sodium, lithium, etc., are now known to be exceptions.

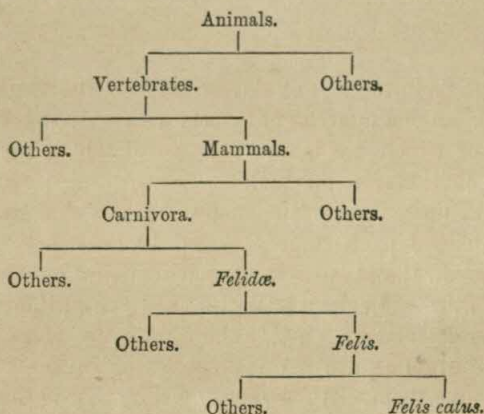
Closely connected with definition is *classification*. Indeed the two proceed hand in hand. The term triangle, as defined, is the name of a class of plane polygonal figures. Let us tabulate:



There is a definite basis of classification. The stages are— (1) many-angled figures, (2) figures with only three angles, (3) all of which are acute, (4) two of which are equal. That which marks off each stage, working downwards, from the preceding group, is termed the *difference*; and the groups at each stage are said to be *sub-ordinate* to that above it, and *co-ordinate* with others on the same line. Thus isoceles triangles are co-ordinate with equilateral triangles and subordinate to acute-angled. The co-ordinates are termed *species*, subordinate to the *genus* above them. At the top of the table is the *highest genus*, at the bottom the *lowest species*. But the terms “genus” and “species” are logically relative. Triangles form a species in relation to polygons: but a genus in relation to acute-angled triangles. The connection between classification and definition is thus clear. We define an isoceles triangle by indicating the difference which marks it off from the genus to which it is subordinate—that

which contains acute-angled figures, within the higher genus of triangles. Such definition was said of old to be *per genus et differentiam*. The phraseology may sound pedantic; but whenever we limit a common name by an adjective—when, for example, we speak of a “red rose” or a “humorous story”—we are applying the principles of classification and definition.

It must be remembered that any definition is of value for some purpose and within some universe of discourse, and is accepted by common consent. The logical definition of “genus” and of “species” is implied above. In biology these terms are applied to certain limited stages of the classification of animals and plants. Let us tabulate:



Zoologically the term “genus” is by common consent restricted to the group *Felis*, the term “species” to the “*Felis catus*,” comprising wild and domestic cats. To the other logical genera other terms, such as “family,” “class,” etc., are applied. The table given is illustrative, not exhaustive. Modern zoologists would insert other stages. Of course

under others several groups may fall, for example, *Felis tigris*, *F. leo*, *F. leopardus*, etc. Under *F. catus* fall individual cats, including mine, whose proper name is "Sir Thomas."

The questions, discussed by students of logic, whether proper names have any connotation, and what is the relation of connotation to denotation in the abstract name, need not be considered. Such discussions may seem somewhat subtle and formal. The teacher may regard them as of little service to him. But their value lies, not so much in the decision at which we arrive, as in the exercise it entails in thinking out the functions of the words we are constantly using. A proper name, it is urged, has no connotation, because, though it may *suggest* much which experience has disclosed, it does not necessarily *imply*, as a name, any definable qualities or attributes. It is attached for purposes of recognition to an individual person, a place to be specified, a particular event. It just denotes a unique identity. On the other hand, the proper names, William Shakespeare, London, French Revolution, have for most of us a significance which seems to be rather arbitrarily distinguished from connotation. And Dr. Bosanquet¹ says that such proper names do connote "whatever may be involved in the identity, or is instrumental in bringing it before the mind." All adjectives are unquestionably connotative (including, I suppose, Shakespearian, Darwinian, and the like), they connote or imply certain attributes; and all predicates are or have the force of adjectives. From them abstract names or attribute terms are derived, such as hardness, purity, strength. Here what is denoted is the attribute itself. But what, if any thing, is connoted? In the case of singular abstract names there seems nothing left for them to connote—though even such a term as resistance seems to imply material as contrasted with

¹ *Essentials of Logic*, p. 93.

immaterial properties. "But when an abstract term is the name of a group of attributes, there seems no good reason," says Mr. Welton,¹ "for denying that it is connotative. Thus, virtue is a name common to justice, beneyolence, veracity, and other qualities of conduct which men agree in regarding as praiseworthy; it, therefore, denotes those good qualities, and connotes the attribute 'goodness' which they possess in common." I must repeat, however, what I said above, that the value of such discussions lies in making us pause and think of the real significance of the words we are daily using.

And now, having glanced at the logical implications of individual words, let me once more emphasise the importance of fully grasping the fact that they merge their individuality when they are in actual use. It is essential that the teacher should steadily bear in mind that what his pupils should be thoroughly familiarised with is the *free life* of words—with the individuals as they live, move, and have their being in the natural world of language. In a dictionary they are dead. They are like insects pinned out in a cabinet or like birds stuffed in a museum, each with its descriptive label. The dictionary museum—like other museums—has its educational function, but only in due relation to the natural occurrence of that which is found therein. Our smaller dictionaries contain all the words in common use, each with a brief definition of its meaning or significance. These names are like stuffed birds in a museum, each perhaps in its most characteristic attitude, but how different from the living creature! Suppose we know quite well the sea swallow or tern standing there on the shelf amid other sea-birds. Are we sure of recognising it on the coast-line as it lives its joyous life? So, too, with words. We look out "breath"

¹ *Manual of Logic*, vol. i. § 36, iii. p. 89.

in Chambers's *Etymological English Dictionary*; we find that it is "lit. *steam, vapour*; the air drawn in and then expelled from the lungs; a single breathing or the time it occupies; fig. life; a pause; an instant; a gentle breeze." And then we go out for a breath of fresh air, and feel that the breath of spring is on the country. Our bird has not been stuffed in either of these attitudes. Look out the words "delicate," "shade," and "reference," in the dictionary, and see whether the museum definitions suggest just those "delicate shades of reference" which are found in the free life of words.

If our smaller dictionaries are like verbal museums, our larger dictionaries are analogous to zoological gardens. For sentences or phrases are given from accredited writers in which the words live—but under cramped and artificial conditions. For any word in a sentence or phrase torn from its fuller context, though it has more vitality than it has in the museum, still lacks the wider backing of its free literary life. It may seem an exaggeration to say that you cannot understand any phrase of *In Memoriam* unless you know the whole poem; and yet it is true that the atmosphere of the whole pervades every part. You may exhibit your beaver and his builded dam in a cage; but the surrounding Canadian swamp, which forms the natural setting of the wild creature, is absent. And the moral of all this is, not that we should abolish our museums and zoological gardens, which serve a useful educational purpose, not that we should burn our smaller and larger dictionaries, but that we should, wherever possible, first study animals and words in their native haunts, and remember that museums and dictionaries are secondary aids to and for reference.

And when we turn to the dictionary in this way we find for each word (unless it be a technical term in some

branch of art, craft, or science) not one significance, but several, as in the example "breath" cited above. Some words preserve their literal significance but have other figurative uses; in others the literal meaning has become obsolete. But the point is that which usage (of the several that are given) applies in any particular case, is determined by the context in which the word is found as an organic part of the living tissue of language. What the dictionary gives, is a list of the leading lines of reference for each word—the bigger and better the dictionary the fuller the list. But which is educationally of greater value: to learn by heart an exhaustive list compiled by the very latest authority, who has garnered all that his predecessors have won from the field of literature, and added some few grains to the store; or to compile for oneself a little meagre list, every grain of which has been personally gathered in the sunshine and fresh air of the smaller field in which one has gladly reaped? "For," as Professor Adams¹ reminds us, "each of us makes his own little dictionary, which agrees more or less with those of others." This private and internal dictionary which we make as we go along our educational way, is a bit of real knowledge won by our own thought and experience in the field of language. We can supplement it by turning to the printed pages of the stout volumes on our shelves; but the essential thing is to have our own private store of significant reference to serve as a nucleus. "The standard dictionary, then," as Professor Adams says, "must be treated as the *terminus ad quem*, not as the starting-point in education. The pupil must first learn to use his own private internal dictionary, and then learn to compare and correct it with the standard dictionary." And the teacher who guides him

¹ John Adams, *The Herbertian Psychology applied to Education*, p. 186. This racy little book will well repay careful study.

in his task must always remember that nature-study in words should begin in the free country of language as it lies open to our observation.

There is one more point that may here be noted. Professor Adams¹ puts it clearly and concisely when he says: "Words as found in actual use, may be divided into two great psychological classes, as transitive and substantive. The latter we can pause upon and consider; the former are always upon the wing. The distinction does not correspond to the parts of speech, and has little to do with grammar." The transitive elements in language therefore correspond to the relational turns of our thought as it passes from one substantive concept to another. Our psychology is too apt to deal almost exclusively with the substantive concepts, partly because it tends to study knowledge as arrested in a sort of instantaneous photography and does not sufficiently realise that the essential feature of our thought lies in its free movement. In the instantaneous photography of language the words which stand for the transitive states are in a sense caught and held for our inspection. But the more carefully we inspect them when thus caught, the more does their function as transitive elude us. For we inspect them in and for themselves as units; we tend to isolate them. But it is just as isolated in and for themselves that they lose their transitive force. It is only as thought flies past them, almost heedless of their existence, that they are of relational value. Thus it is true, as Professor Wm. James² says, that we ought to speak of "a feeling of *and*, a feeling of *if*, a feeling of *but*, and a feeling of *by*, quite as readily as we say a feeling of *blue* or a feeling of *cold*." The worst of it is, that the more steadily we focus

¹ *Op. cit.* p. 185.

² *Principles of Psychology*, vol. i. p. 247.

our attention on the *and*, the *but*, and the *if*, the less does it represent these elements in a living sentence along which thought moves freely. Professor James¹ fully realises this. He says: "Now it is very difficult, introspectively, to see the transitive parts for what they really are. If they are but flights to a conclusion, stopping them to look at them before the conclusion is reached is really annihilating them. Whilst if we wait till the conclusion be reached, it so exceeds them in vigor and activity that it quite eclipses them. . . . The attempt at introspective analysis in these cases is in fact like seizing a spinning top to catch its motion, or trying to turn up the gas quickly enough to see how the darkness looks." Still, though there is this difficulty in all introspection, yet in retrospection we can look back, and to some extent, and not altogether inadequately, apprehend the nature of the transitive states, the relations of our thought, as they occurred when the thought was in full flow. In any case this brief allusion to the transitive elements in language and in thought may serve to emphasise once more how essential it is to deal with the free and living organism, and not merely with the most elegantly mounted museum specimens.

¹ *Op. cit.* pp. 243, 244.

CHAPTER VIII

DESCRIPTION AND EXPLANATION

WE have seen that practical experience deals with the concrete phenomena of the world in which we live, while systematic knowledge deals with general conceptions and ideal constructions in terms of which such phenomena may be interpreted. Language ministers to the development of both. Description is in closer touch with practical experience as such: explanation brings the experience into relation with systematic knowledge. Description gives an answer to the question "How?" Explanation to the question "Why?" And it is clear that in logical order, and in psychological development, description should precede explanation.

Even description, however, as we have seen, implies analysis into constituent factors and their synthesis into a whole, which may be understood as such. It is a means of ideational intervention between the perceptual experience of the speaker and that of the hearer. But the ideational character of the intervention is rather implicit than explicit.

It is clear that in order that description shall effect its purpose, the words employed should carry meaning for practical experience; but they may be so ordered as to indicate the nature of that which has not yet been experienced. We wish, for example, to describe quicksilver to

a class of children. We say that it is something like this pewter in its brightness and the way in which it reflects light; it is even heavier than this lead; it is liquid like oil, so that it could be poured from one vessel to another. And we perhaps qualify each of these statements by additional comparisons between the unknown quicksilver and things the children can see and handle. Now all the words we employ are "universals," but our object is to prepare the class for what they would find quicksilver to be in actual experience. We thus see that the function of description is to be preparatory to or supplementary of actual experience. And wherever possible it should be allowed to lead up to observation, for which it is only a temporary substitute. Such observation is sure to disclose much which was not introduced into the preliminary description; and the children should be asked themselves to describe the additional features they observe. Thus description may be made a test of the range and accuracy of observation.

It is, however, quite impossible to put to the test of personal observation all that we learn through description. Huxley required a volume to deal with the common crayfish; and it would take the student months or years of careful observation to render all the statements in that work part of his own individual experience. In geography the pupil learns much from description which he will probably never have an opportunity of observing for himself. For no one can the whole realm of experience recorded in language have that full and complete meaning which can only be acquired through personal investigation. Much must be accepted on the testimony of competent observers. What, then, can we do? How do we stand? I take it that the educational ideal is to establish such foundations of direct and first-hand experi-

ence as shall support the superstructure of description, and shall supply the sense of confidence involved in ability to submit any statement to the touchstone of observation. That should be the result of practical work in the physical, chemical, or biological laboratory. Description is the paper currency of experience. The trained student can convert this paper currency into observational coins of the realm of experience when opportunity offers and need arises. And he has had so much experience of such conversion that he knows what paper currency is valid and what is spurious; what may be at once accepted, and what demands observational confirmation before it can be counted as a safe asset at the bank of scientific knowledge. Is not one of the main functions of education to teach pupils how to test the paper currency of description?

Description, then, is preparatory to observational experience, or supplementary thereof, and incidentally affords a valuable means of testing the accuracy and range of observation. It is also an exercise in the clear, correct, and effective use of language. Its relation to assimilation—or the incorporation of new experience within the body of the old—is close. We might speak of assimilating a description and be well within the common usage of the term. But it might conduce to clearness if we were to reserve “assimilation” for the process of incorporation through direct observation, and to use the term *apprehension* for the preparatory or supplementary incorporation by the hearer of what is communicated through description. If, for example, we describe the nest and eggs of the golden-crested wren which may be found beneath the deodar spray in a certain position in an old garden, the information conveyed will be apprehended by those who have some practical experience

of birds' nests. But this will not have the same value as direct assimilation by actually finding and seeing the gold-crest's nest. If, however, we employ the terminology here suggested we must bear in mind that we are imposing limitations on both these terms, and must be prepared to find in the course of our reading many cases in which they are used interchangeably.

It is perhaps worth noting here that nature-study lends itself admirably to the wise employment of description as preparatory to observation, and of further description as supplementary of what has been observed. Nature-study also affords ample material for a training in the art of descriptive expression in suitable language on the part of the children themselves. It should be freely utilised in relation to exercise in composition, since it is in such close touch with what children have actually seen in the field of nature, and also affords insight into their modes of regarding natural objects and occurrences.

But it also offers abundant material for generalisation, it introduces our pupils to classification, and fosters the attitude of comparison. Of course the generalisations reached, the classification adopted, the comparisons instituted, are not yet adequate for the purposes of exact science. But in so far as they arise in contact with actual phenomena, in so far as they deal with what the child himself observes, and in so far as they are genuine of their kind, their educational value may be great; and they may also lay the foundations not only of a desire to interpret more adequately the world in which we live, but also of a fuller appreciation of the wealth of beauty and interest with which that world is stored.

Both description and generalisation presuppose analysis, and the process of comparison through which, as we have seen, the products of analysis and the relations they

involve are rendered explicit. We describe, for example, a pebble we have found on the beach as oval, grey, moderately heavy, tolerably hard, and made of limestone. In doing so we make predominant in succession the several salient features of the object, and this, as we have seen, is just what is characteristic of the process of analysis. In the corresponding act of apprehension the pupil takes these several features, given to him, from the nature of the case, in succession, and combines them by an act of synthesis into a whole. Not until the several features are thus combined can he be said to apprehend the description as a whole. But suppose a child asks, "Why has the pebble this rounded form?" We give him as a preliminary answer, "Because it has been rolled about by the waves." And if he then asks—as we should encourage him to ask—"But why does the rolling of it by the waves give it a rounded form?" we should, if opportunity occurs, take him down to the beach, show him how the waves are rolling the pebbles over each other and knocking them against one another; describe in particular cases how each stone has its angles knocked off and rubbed down; and when he has apprehended this description, get him to comprehend the generality of the result. All the pebbles are thus rounded; among others perhaps some pebbles of bottle-glass. It is, given sufficient time, the universal and uniform result of this mode of natural action. When he has comprehended this generality of the effect produced, we give him the explanation of the rounded form: "Because the pebble has been rolled about by the waves, *and it is found that such rolling always gives rise to a rounded form.*" This explanation, and its due comprehension, involve analysis, for we are making the shape predominant to the temporary subordination of other features presented by the pebble;

and it presupposes generalisation, for we explain it by showing that it is a particular example of the action of a general law. It is true that this explanation is of a low order of generality, not going far beyond the description of the particular case; but it does involve generalisation.

While description has primary reference to the body of practical experience and ministers by ideational means, and through the universals of language, to its extension, explanation has a more explicit ideational character, is always in conscious touch with the system of knowledge, and brings the particular case into definite relation to the general principle or universal rule. We may describe, for example, how (that is to say the manner in which) a dry needle, if gently lowered on to the surface of water, will float. Our pupils will apprehend the description if they have seen other bodies, such as sticks and straws, floating. By trying the experiment for themselves they may assimilate the fact through observation. So far there is no explanation; perhaps no need of explanation is felt. Children, and for the most part the majority of older folk, are quite content to accept experience at its face-value without asking, why? And this question seldom arises unless there is some discrepancy between the results of observation and that which expectation suggests. Wooden matches float. Few children think of asking why. We have to prompt them to do so. If we then tell them that the match floats because it stays at the top of the water, we are merely expressing the same fact in other terms. If we say that it floats because it is lighter than water, our answer may be a valid explanation. It is a particular case which exemplifies certain universal properties of bodies in accordance with which they always, if free to move among each other, arrange themselves under the influence of the earth's gravitative attraction, in order of

weight from the greatest to the least. The lighter match gets on top of the heavier water. The heavier pebble goes to the bottom of the relatively lighter water. But the steel needle is heavier than water, and should therefore go to the bottom, as indeed it does if put into the water point downwards. There is thus a discrepancy between the action of the dry needle lowered lengthwise on to the surface and the general rule. We expect it to sink, but as a matter of fact it floats. This calls for explanation. Why does it float, notwithstanding the fact that it is heavier than water? Now we cannot adequately and fully explain this to a pupil who has not a system of physical knowledge of considerable coherence and complexity. None the less we may to some extent give a valid explanation, so far as it goes, even to children. We can only do so, however, by describing and performing other experiments. We dip our finger in water, and see a drop adhering to the end as if it were enclosed in an invisible elastic bag. Again, we fill a wine-glass nearly full of water, and then add more, little by little, until the liquid rises above the level of the rim. What holds the water back and prevents it flowing over the brim? It looks as if there were an invisible elastic skin which restrains it. Again, we make a closed loop in a piece of wire and dip it into water, and note the thin sheet of liquid which fills the loop. What keeps the water stretched across the opening? May it not be a delicate surface film? We may take a clay pipe and soapy water and blow bubbles. Having blown a fairly large one, still attached to the pipe bowl, we watch it slowly contract. What pulls it together? The tension of the surface film. Thus, as the result of a number of different experiments and observations, we lead up to the conclusion that a peculiar property of the surface of water is disclosed by them. There is an elastic surface film. If

now we say that the dry needle floats because it fails to break the surface film, we are referring the particular case to a general rule which we have found to hold good under various conditions. So far as it goes this is a valid explanation. We describe the several cases, enable our pupils to assimilate the facts by actual observation, fuse the results in a general concept concerning the nature of the surface film, and explain the particular case as an example which falls under a general rule. It will be noticed that each experiment is a presentation for which the previous consideration of the whole matter is a preparation. By comparing the presentations with a definite end in view we lead up to the generalisation. The next time we are by a pond's side we may see if our pupils have sufficient powers of application to tell us why the long-legged insect skaters are able to walk on the water, not sinking into it, but merely indenting its surface. If our pupils have no systematic knowledge of molecular physics we cannot carry the explanation farther. We must be content with having shown that the possession of a surface film is (so far as our observations have carried us) one of the properties of water. In this case the man of science can go a stage farther, and explain why water has a surface film. But if we go on asking similar questions he, too, at last is forced to say: "This is the way in which things are constituted." The teacher should be very careful to remember that if he "explains" this constitution of things as so made by God, he is using the term "explains" in a different sense. He is not stating in general terms that which is common to a number of presentations: he is giving an answer to the quite different question how there come to be presentations which we can deal with systematically. In the one case we are accepting our experience and building a scheme of knowledge out of the data which, by abstrac-

tion, we derive from the experience. In the other case we are endeavouring to account for the fact that we have experience and can attain to knowledge. The end—in both senses of the word “end”—of natural explanation is a knowledge of the constitution of nature—not of its origin.

A good many years ago, when I was a young student, a clever lad in Cornwall asked me the old question, “Why does a stone fall to the ground?” Not wishing to put him off with the long-sounding words, “Universal gravitation,” I replied, “Because it is heavy.” “But a feather is not heavy, and yet it falls to the ground,” was the prompt answer. I replied that the feather was relatively heavier than the air. The lad was silent for a moment, and then said, “That’s just one of the things I want to know: does the air fall to the ground and collect there like water in a pond, only we cannot see it because we are in it and it is invisible?” I saw that this lad’s powers of comprehension were fully equal to the occasion, and explained the whole matter as best I could. I told him that he was quite right in supposing that the air, like the stone and the feather, was attracted by the earth; I pointed out the universality of gravitation as a law of nature; and then reverting to his first question, I said, “You now see that we explain the fall of the stone as a particular case of the action of a law that is universal in its generality.” He was again silent for a moment, and then asked, “But what makes the earth attract it, after all?” I laughed, and said, “You’re a philosopher! Nobody can answer that question. Perhaps you may live to find it out, or at any rate to understand the solution when it comes, as come it may.”

The explanation of the fall of a stone by reference to universal gravitation is a valid explanation; but the explanation is partial and incomplete, not final and ultimate. We cannot give a final and ultimate explanation of any

of the phenomena of nature. We explain this, that, or the other natural occurrence by a reference from the particular to the general; but if we are asked, "Why are these general laws what we find them to be?" the only *scientific* answer is: "That is how nature is constituted."

We have seen that the avenue to ideational process is through comparison, by which we reach inductive generalisations and apply them deductively to particular cases. *Induction* and *deduction* are complementary processes. In the life of thought we constantly oscillate between the example and the rule. Thus we raise comparison to a higher plane. It goes to and fro between the particular case as an instance of a universal principle, and the universal principle as exemplified in the concrete case. In view of the general rule the particular case is apperceptively assimilated to the system of knowledge. The relations peculiar and special to explanation are those which we symbolise by the terms "therefore" and "because." And the logical attitude it fosters is that of *inference*. "You obtain the most vital idea of inference," says Mr. Bosanquet, "by starting from the conclusion as a suggestion, or even as an observation, and asking yourself how it is proved or explained. Take the observation, 'The tide at new and full moon is exceptionally high.' In scientific inference this is filled out by a middle term. Thus the judgment pulls out like a telescope, exhibiting fresh parts within it as it passes into inference. 'The tide at new and full moon, *being at these times the lunar tide plus the solar tide*, is exceptionally high.' This is the sort of inference which is really commonest in science."

In the specialised ideal constructions of formal logic, we have the *syllogism* in which three propositions containing three, and *only three*, terms are brought into relation under certain formal rules. These rules we cannot here

attempt to discuss; nor can we consider the different kinds or figures of syllogism. It must suffice to give a simple example in the first figure. Take the syllogism—

All rodents have chisel-teeth;

The mouse is a rodent;

Therefore the mouse has chisel-teeth.

The final proposition is called the *conclusion*, and the other two from which it is derived are called the *premisses*. The predicate of the conclusion is spoken of as the *major term*, the subject of the conclusion being called the *minor term*; while the third term, which forms the subject of the first proposition and the predicate of the second, is known as the *middle term*. The premise which contains the major and middle terms is called the *major premise*; that which contains the minor and middle terms, the *minor premise*. It is convenient to express the syllogism in its most generalised form by using symbols for its terms. Thus, denoting the major term by P (because it is the predicate of the conclusion), the minor term by S (as subject of the conclusion), and the middle term by M, and representing the copula by ., we have the following generalised form of such a syllogism in the first figure of formal logic:

M . P;

S . M;

∴ S . P.

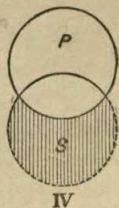
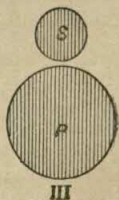
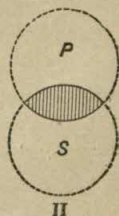
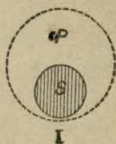
There are, however, certain rules to be observed. We have seen that any name denotes the objects to which it properly applies. A term is technically said to be *distributed* when definite reference is made to the whole of its denotation, that is, to the whole range of objects to which it applies. If we say: All sheep are herbivorous, we express a universal affirmative. The term "sheep" is distributed; but not the term "herbivorous." There

are other herbivorous animals than sheep. What we mean is, that all sheep are included in the larger group. We neither mean nor say that all herbivorous animals are sheep. This may be expressed diagrammatically in Fig. I. The shaded part S is included within, but is not co-extensive with P. If we say: Some sheep are black, we express a particular affirmative. Neither term is distributed. There are other sheep which are not black, and other objects which are black. In Fig. II. the circles intersect, and the assertion is only made with regard to the shaded portion of each. If we say: No sheep are carnivorous, we express a universal negative. Both terms are distributed. For we must think of the whole universe of carnivorous animals and the whole universe of sheep before we can be sure that the groups are mutually exclusive. The circles in Fig. III. have no part in common. If we say: Some sheep are not black, we express a particular negative. The subject is not distributed; but since we are thinking of the whole group of not black objects as including "some sheep," the predicate is said to be distributed (Fig. IV.).

If now we place these propositions in order they run thus:

- I. Every S is P.
- II. Some Ss are P.
- III. No S is P.
- IV. Some Ss are not P.

It is clear that I. includes II., and III. includes IV., but that on the basis of II. we cannot jump to I., nor on the



basis of IV. can we jump to III., save for the purposes of ideal construction. It is also clear that I. and IV. are contradictory, as are III. and II. Of each of these pairs of propositions one must be true and the other false: there is no alternative. But I. and III. are contraries. The assertions are poles asunder. Both cannot be true, but both may be false. There is the alternative of II. With regard to II. and IV. both may be true; some sheep are black and some are not black. But they cannot both be false; if there are such animals as sheep, they must either be black or not black.

Now in any syllogism, or in any combination of three propositions which may be thrown into syllogistic form, we have first to remember that there must be only three terms, and each term must be used in one sense only. The term "good teacher" may mean a man who teaches well or a good man who teaches. We cannot therefore say that because Mr. Smith is a "*good teacher*" he must be a "*good teacher*," though the terms (apart from the emphasis) are the same. The following rules must also be observed. The middle term must be distributed in one of the premisses, and no term must be distributed in the conclusion which has not been distributed in one of the premisses. That is to say, we must not jump from "some" to all. Because witty boys are clever, and some Irish boys are witty, we cannot reach the conclusion that all Irish boys are clever. Nor, if we grant that all schoolmasters are able men, can we infer that Mr. Brown, who is an able man, is a schoolmaster. The next rule, that from two negative premisses no conclusion can be drawn, is sufficiently obvious. Suppose it were true that the study of classics is not a useful discipline, and that German is not a classical study, there is nothing in these premisses to justify the conclusion (though it may be

true in fact) that German is a useful discipline. If one premise is negative the conclusion must also be negative. Suppose children have been told that the higher animals either breathe oxygen dissolved in water by means of gills, or breathe the atmosphere by means of lungs, still it would be incorrect to say that, because young tadpoles breathe by means of gills, and the grown frog is not a tadpole, it must breathe by means of lungs. It does not logically follow that because a frog is not a tadpole its mode of breathing changes, although as a matter of fact this is the case. From two particular premisses no conclusion can be drawn. It may be quite true that some boys are good cricketers and some are also industrious, but it does not follow that some good cricketers are industrious, nor even that some are not. Finally, if one of the premisses is particular, the conclusion must also be particular. Granted that all poisonous creatures are harmful to children, and that some snakes are poisonous, it does not follow that all snakes are harmful, though children may be advised not to touch any snake, so as to avoid possible risk.

Failure to observe any of these rules, for example in the manner above indicated, involves a formal *fallacy* of deductive logic. But apart from the detection of fallacies (which, after all, are generally disclosed by the application of a little common sense) the educational value of elementary logic, like that of the analysis of sentences, consists in the discipline it affords. It should be employed as an exercise, first, in converting assertions, made in the varied modes of literary or scientific expression, into propositions in logical form; and, secondly, in throwing into syllogistic figure the conclusions reached by inference.

There is, however, as Dr. Bosanquet points out, somewhat of a paradox in inference. "We have not got

inference unless the conclusion—(1) is necessary from the premisses, and (2) goes beyond the premisses. To put the paradox quite roughly—We have not got inference unless the conclusion is—(1) in the premisses, and (2) outside the premisses." So obviously is it in the premisses, so little does it lie outside them, that in many of the elementary examples of the syllogism we are tempted to feel that it is hardly worth while stating the conclusion at all. If all rodents have chisel-teeth, the mouse included, of course it, too, has chisel-teeth. It should be remembered, however, that the syllogism does not profess to indicate the manner in which inferences are reached; but rather a form in which they may be so stated that their validity may be tested.

Inferences are continually being reached in all departments of school work. It may be helpful to consider a particular case selected from comparatively elementary work in physical measurement. We take a lath of box-wood of convenient length to act as a lever. Across the middle, on the lower side, is a notch which fits on to a triangular fulcrum. The upper surface is marked with a scale of units of length, say inches, twenty on either side of the middle line above the notch, and numbered from this line outwards. We have also a box of weights in ounces from one to twenty. We now make experiments in balancing the weights on the lever. We find that

Weight.		Distance.		Weight.		Distance.	
2	at	10	balances	4	at	5	
7	"	6	"	14	"	3	
3	"	8	"	6	"	4	
20	"	10	"	10	"	20	

Now from these cases we can draw the inductive inference that if we double the weight we must halve the

distance. Here, then, is a generalisation. If it holds true of other like cases we may deductively infer that, for example,

Weight.		Distance.		Weight.		Distance.
9	at	16	will balance	18	at	8
3	„	12	„	6	„	6
5	„	2	„	10	„	1

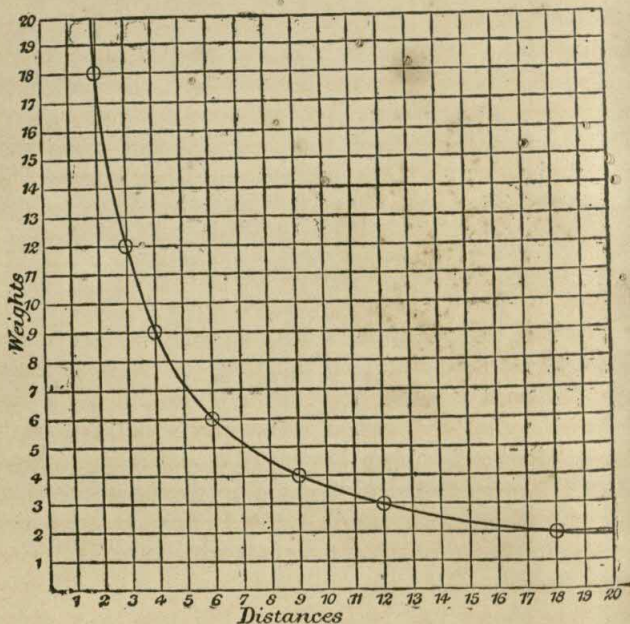
and so on. The correctness of each inference may be shown by experiment. The pupils may now be required to find out for themselves what will be the result of trebling the weight, or multiplying it by any whole number, and may be led up to the wider generalisation that x times the weight must always be placed at $\frac{1}{x}$ times the distance. They may also be led to see that the product obtained by multiplying weight by distance on one side of the fulcrum is always equal to the similarly reached product on the other side of the fulcrum.

In a subsequent lesson the procedure may be slightly different. The pupils may be told to place the 6-ounce weight at 6-inch distance. They may be also directed to find out at what distances 2, 3, 4, 9, 12, 18 ounce weights must be placed on the other side in order to preserve a balance, and to tabulate the results.

Weight.		Distance.		Weight.		Distance.
6	at	6	balances	2	at	18
				3	„	12
				4	„	9
				9	„	4
				12	„	3
				18	„	2

The product of each weight-distance pair in the table is 36, so that the generalisation previously reached is confirmed.

The pupils may then be shown how to plot their results in graphic form. The weights have to be translated into their different space values. In the accompanying diagram distances from the fulcrum are represented on



squared paper by abscissæ measured horizontally, and weights by ordinates measured vertically. The actual observations are represented by points; in the diagram the points are, for clearness, surrounded by small circles. The measured values on the graph are proportional to the distances and the weights respectively. The position of any point, therefore, shows the distance from the fulcrum at which any given weight must be placed

to preserve the conditions of balance. A curve drawn through the several points obtained by observation, represents the generalisation which may be drawn inductively from the observations. Now suppose we wish to know at what distance a 5-ounce weight must be placed in order to balance the 6-ounce weight at 6-inch distance. We see from the graph that the vertical line representing 5 ounces cuts the curve where the horizontal line representing about 7.2 inches also intersects it. We therefore infer from the generalisation curve that this is the distance at which a 5-ounce weight must be placed. We apply the generalisation, through its graphic representation, to a particular case, and can test with the lever the correctness of our inference. Technically we say that we have *interpolated* a point on our curve. It may be said that many cases of exact inference are of the nature of interpolations on a curve; or in some cases extra-polations on the curve as prolonged beyond the limits of actual observation. The curve in this case is of a definite kind—it is a branch of a rectangular hyperbola. It can be prolonged indefinitely in either direction. This may serve, with more advanced pupils, to bring the exercise in simple physical measurements into touch with other branches of mathematical work. And it may readily be shown that, on the graph, the rectangular areas of which the ordinates and abscissæ severally define the limits, are all equal, affording another relationship with other disciplines.

No opportunity should be missed of bringing any given bit of work into relation with other studies, perhaps conducted in quite different classrooms. A further example may be given. Balance equal weights at equal distances on the lath, remove the fulcrum, and support the lath on a loop of string fitting into the notch.

Then set the whole rotating, and show that the weights rotate evenly around the point of the lathe which is in the vertical line of the string. By other experiments with unequal weights bring out the fact that, under the conditions of balance, the centre of rotation is the middle point of the notch. Take a special case, and make it clear that two weights, respectively, 1 and 8, will rotate around the centre at distances respectively 8 and 1. Ask what the respective distances will be if the weights or masses are 1 and 80. Bid the pupils imagine that the lath and the string melt away, leaving only the two masses swinging round in space at a distance of 240,000 miles. Lead up to the inference that the common centre will be in miles $\frac{240,000}{81}$ or 2961.73 (nearly) from the centre of the

larger mass. And make clear that masses of the earth and the moon are in the proportion of 80 to 1; that they are 240,000 miles apart; that the point around which they rotate is therefore about 2962 miles from the centre of the earth; that, since the length of the earth's radius is 3960 miles, the centre of rotation lies within the earth; and that we are therefore justified in affirming that the moon revolves around the earth. Similarly make clear that, if physical principles established in the laboratory hold good throughout the solar system, the earth must revolve around the sun, or more exactly, the earth-sun system rotates around their common centre, situate some 300 miles from the centre of the sun. If the pupils have sufficient knowledge, it may be shown that the inferred motion of the earth in space is *verified* by observations on the aberration of light coming from the distant stars.

Let us now return to our graphic representation of a scientific generalisation in the form of a curve. The

drawing of the curve on the basis of a number of exact observations is a case of inductive inference. What we say in effect is, that if all the cases are in line with the observed cases, the generalisation expressed in the curve holds good. Life may not be long enough to observe all the possible cases: but if, whenever we test the generalisation by new cases, they duly fall on the curve, our belief in its validity is confirmed. We assume that it is universally true, until in given instances it is shown by observation to be false. And we assume that it is absolutely true as an ideal construction, until observation discloses measurable errors. We must then explain the cause of error, and, if necessary, modify our generalisation. When we have reached our generalisation curve we apply it deductively to particular cases. We interpolate points on the curve; and such interpolation is deductive inference. This brings us back to the paradox of inference. The interpolated point is already within the curve (or logically within the premisses), but the particular case may never have been considered, may never before have been rendered explicit. In this sense, then, it may be a new fact added to our stores of knowledge. We may never before have realised that it was already implied in our generalisations. Our pupils in the laboratory may not have grasped that in our experiments with lath and weights swinging round the centre of the notch, we were establishing principles which throw light upon the problem of the revolution of the moon round the earth and that of the earth round the sun.

Whenever in matters of exact science we can disentangle two related factors we can express the generalisation in a graphic curve or condense it into a mathematical formula. It is part of the ideal construction to assume that these two factors, and these only, are present, and to

disregard disturbing influences. Thus we can express by such a curve the relation between the time taken and the space moved through when a body falls, or we can condense the generalisation in the formula $s=16t^2$, where s is the number of feet and t^2 the square of the number of seconds. But here we neglect the resistance of the air. It forms no part of the ideal construction.

In the inferences of everyday life, however, in those statements which we make or accept in an attitude of belief, there are often more than two factors; they are not exactly measurable, the generalisations are less definite, and cannot be expressed in a smooth curve on squared paper. None the less it may be said that the acceptance or rejection of such statements does depend upon whether they fall within or altogether outside the curve of our experience and of our knowledge founded thereon. If you tell me that within the universe of actual life a boy nine years old ran a mile in four minutes, I decline to accept the statement. It does not fall within the rough and inexact but relatively serviceable curve I have formed from the records of the athletic field. If I see it stated that Cromwell told a deliberate lie to attain a mean end I reject it as false, because it does not accord with my conception of the Protector's character. If, again, a novelist makes his heroine take a certain line of action, I may exclaim, "I don't believe she would have acted in such a way." And if I am asked to explain the grounds of disbelief, I reply in effect (though I may put it less pedantically) that the action is right off the curve of the ideal construction which the author has himself in earlier chapters delineated. He has failed in making the character consistent within the universe of an artistic treatment intended to be true to life. Once more, it must be remembered that what we accept in the attitude

of belief is always within an appropriate universe of discourse. In a work of imagination such as Mr. H. G. Wells's *Invisible Man*, I at once accept the scene in the rain, where a film of water in human shape is seen proceeding down the street. I surrender myself to the conditions within the imaginative universe of discourse. Granting that the man himself was invisible, but that one could see the water which wetted him, a sort of filmy soap-bubble in human shape is exactly what one would expect. It falls within the curve of experience under the circumstances created by the imagination. Hence my glad acceptance in the attitude of belief of Mr. Wells's clever development of his theme.

• We commonly distinguish belief and knowledge. But they shade the one into the other. Both are mental attitudes which we take up in face of what we call facts; and facts are always interpreted by thought in terms of belief, when we realise that there is some uncertainty in the interpretation, or of knowledge when we have proved the correctness of the interpretation. So regarded, belief belongs to the intermediate region between naïve perceptual acceptance and the conceptual assurance of organised systematic knowledge. Its correlate is the presence or possibility of doubt. Some authors, however, contend that belief is never complete until all doubt is excluded. In any case there is involved the taking into consideration the relation between generalised experience and some particular case. Still, the explicit grounds of belief often come to no more than an assertion that the accepted interpretation does, as a matter of what we call fact, fall within the curve of our experience. This, after all, is for most of us the test of truth. Indeed, it is questionable whether there is any other test of truth than congruity and consistency with the fully organised system

of knowledge. But, as Mr. Welton reminds us, as knowledge is always advancing and being re-organised, it is often impossible to say with perfect assurance that any particular item of our interpretation of the world is true. Further knowledge may, in many cases, necessitate a revision of such interpretations in the future as in the past. Where the organisation of knowledge is still very far from approaching completion, as in children, we have a readiness to accept any interpretation offered—we have an attitude of credulity.

The generalisations of daily life are for the most part of the nature of only partially confirmed and scarcely at all verified guesses. The majority of us, and this is especially true of children, jump hastily to general conclusions on a slender basis of observation and often on mere hearsay. And we are only too prone, as are children, to render an explanation of particular occurrences in the light of very unsystematic knowledge. Apart, however, from slipshod, hasty, and faulty generalisations or opinions founded on a wholly inadequate body of data, and these data uncritically accepted, the problems themselves are often exceedingly complex, contain many diversely related factors, and are therefore peculiarly difficult to deal with systematically. We see this, for example, in the questions arising out of recent Education Acts, or out of fiscal policy, or out of the condition of South Africa. Each of us forms his own opinions; but they contain much that is hypothetical, an over-emphasis on those factors which appeal to our special prejudices, and, in fine, a net result which we are often incapable of submitting to logical analysis. No doubt education ought to do something towards preparing the rising generation to deal with the larger social problems in which this difficulty is most acutely felt. But guidance is afforded rather through the

insensible influence of a wise teacher than through any set and formal discipline. Sound opinions are the outcome of that most subtle and indefinable attribute of a minority of human folk which we call wisdom; and this it is hard or impossible to teach. Only through the insight and tact of a wise man can it be fostered. And in the best education in the field of the humanities much is done in this direction.

In the field of nature the problems are simpler, and it is far easier to frame ideal constructions the validity of which may be tested. That is one of the reasons for the modern advocacy of science-teaching. It is (among other things) a discipline in the framing and testing of possible and probable explanations. Common and familiar observations may often be made the starting-point, for it is always desirable, wherever possible, to bring experimental work and scientific treatment into touch with familiar occurrences.

It is not infrequently the case that when certain natural phenomena have been carefully observed and accurately described, two or more alternative explanations are possible. Such alternative explanations are termed *hypotheses*. To decide between them, we need what is termed a *crucial* observation or experiment. We see, for example, the sun, moon, stars, and planets rise in the east, sweep across the heavens, and set in the west. Now, it is a generalisation from a great number of observations, that the apparent movement of a body external to ourselves may be due—(1) to the actual movement of that body while we are stationary, or (2) to our own actual movement, the external body being stationary, or (3) to the difference between its movement and our own. The apparent diurnal movements of the sun, moon, and stars may be due, then, to the revolution of the heavens round

the earth, or to the rotation of the earth, or to a difference between the two. These are the alternative hypotheses on which the observed phenomena may be explained. In times gone by the generally accepted hypothesis was that the heavens revolved around the earth. Now, as we all know, the accepted hypothesis is that the earth rotates on its axis once in about twenty-four hours. What has convinced us that this is the true explanation? What was the crucial observation or experiment?

Consider a "conical pendulum," *i.e.* a weight, at the end of a fine thread or wire, which is capable of swinging freely; set it swinging; its plane will remain unaltered unless something interferes with it from without. Why should it alter? There is no generalisation which enables us to answer this question except by saying that there is no reason why it should alter; but, on the other hand, there is a very wide generalisation to the effect that bodies remain in their state of rest or of uniform motion, except in so far as they are influenced from without. We can, however, put the matter to the test of experiment by setting a pendulum (a weight at the end of a fine thread will serve the purpose) swinging in a pail. Now, while it is swinging, turn the pail round, making the vertical line containing the point from which the weight is suspended the axis of its rotation. The plane of swing remains unaltered in direction; thus we obtain experimental proof of the constancy of the plane of oscillation. We are now in a position to apply experiment to our special problem. A long heavy pendulum is suspended from a lofty ceiling, with special precautions to secure perfect freedom of oscillation; if now this be set a-swinging at 12 noon, and the direction of its swing be carefully noted, by stretching a string, for example, beneath and parallel with the swinging point; and if,

after leaving it for three hours, the pendulum and the string be again observed, it will be found that the point is no longer oscillating parallel with the string, but across it at an angle the precise value of which depends on the latitude of the place. Since, then, the plane of oscillation of the pendulum has remained unaltered, it must be the string that has moved. But the string was fixed to the floor, and the floor to the solid earth. Hence it is the earth that has twisted round. And it can be shown that the amount of twisting is just that which should be produced if the earth is rotating once on its axis in twenty-four hours. This was the great French physicist Foucault's crucial experiment. There are others; but this suffices for purposes of illustration. Such a crucial experiment verifies one of the alternative hypotheses. And it is characteristic of the hypotheses framed in the course of scientific work and in the interpretation of nature that they are susceptible of such verification. They present clear issues which can be put to the test of experiment. Work in the chemical laboratory affords ample opportunity for the suggestion and testing of hypotheses. No doubt the pupils should be led to frame their own hypotheses; but they should also be led to appreciate the essential value of crucial experiments of historical import. The earlier chemists, for example, observed that metals were rendered heavier by calcination; but this might be due either to the loss of something light by nature, which was then termed phlogiston; or the gain of something heavy by nature. Lavoisier calcined tin in an hermetically sealed vessel. The weight of the vessel before and after calcination was precisely the same. Neither had anything light by nature been lost, nor anything heavy by nature been gained. But when the vessel was opened air rushed in. The calcined tin had increased in weight by ten grains.

Ten grains of air rushed in. Hence the tin had absorbed something from the air. Every boy in the chemical laboratory now knows that this was oxygen. But Lavoisier's crucial experiment led to the rejection of the hypothesis of phlogiston. It may be said that our pupils to-day have no time to dally with the rejected hypotheses of the past. That may be so. But even supposing that we are resolved to exclude historical treatment and deem it unnecessary to show the grounds on which early interpretations were shown to be false; still the experiment (apart from any mention of phlogiston or Lavoisier) serves well to exemplify the method of deciding between rival hypotheses. The calcined metal may be heavier because something relatively light has been driven off, leaving behind the relatively heavy substance; or it may be heavier because it has absorbed something. The experiment decides which hypothesis is correct, and opens up the further question: "What has been absorbed?"

The testing of rival hypotheses, then, establishes the validity of an explanation, but only on the condition that all rival hypotheses are thus excluded.

In such sciences as astronomy, physics, and chemistry it is comparatively easy to disentangle the factors which are the essential antecedent or accompanying conditions of any given change—at any rate, in those branches which come within the range of school discipline. In geology, botany, and zoology it is more difficult. In the sciences which deal with social matters it is yet more difficult. The antecedent and accompanying circumstances are often very complex. Those, and those only which are really relevant, constitute the cause (from the scientific standpoint) of any occurrence which we term the effect. They are the essential conditions. To begin with, we commonly start with a vague notion that all the preceding

and accompanying circumstances contribute in some way to the result we observe. If some are selected as the more important, the preference is often given to those which in themselves arrest the attention, or are in accordance with some bias. The aim of scientific procedure is methodically to exclude those circumstances which are irrelevant. It is clear that if certain antecedents are present in some cases, while in other cases there are no such antecedents, the result remaining the same, these occasional and accidental circumstances may be safely excluded. But if we find that all cases agree in the presence of certain other antecedents, the presumption is that they are essential. We have a basis for further inquiry. Constant conjunction, so far as observation goes, may be provisionally interpreted as evidence of constant connection. Such presumption is strengthened, and such provisional interpretation is further justified if there is a proportional variation in the conditions and their outcome. If the tides vary in a manner in accordance with the position of the sun and moon, the attractive influence of these bodies is with greater confidence interpreted as the cause of these tides. But the final test of the validity of any explanation, in terms of the essential conditions, is congruity with the system of knowledge within which the interpretation properly falls. And this consideration guides the man of science at every step of any investigation into causes. If, then, irrelevant circumstances are excluded, if there is a constant conjunction in experience of certain antecedents and the events which follow, if with any variation of the supposed conditions there is a proportional variation in that which we interpret as the effect, and if the explanation thus reached is congruous with the total ideal construction of systematic knowledge, we have valid grounds for asserting

that we have discovered the connection which we term that of cause and effect. No doubt we must assume the uniformity of nature: that is a presupposition to the very existence of systematic knowledge. In other words, it is part of the ideal construction of science. Its justification lies in its successful application in the interpretation of nature. We might, indeed, *describe* the disorderly happenings in a world in which there was no uniform connection between cause and effect. But we could explain nothing. We could frame none of those generalisations which afford a basis for explanation.

Both description and explanation presuppose someone to whom, or for whose sake we describe or explain. They refer to the action of the giver, and imply one who receives. If we agree to use the term "apprehension" for the answering activity on the part of the receiver in the case of description, analogy and etymology suggest the employment of the term "comprehension" for the part played by the receiver of an explanation. One who readily understands a description may therefore be said to have good powers of apprehension; one who readily understands a verbal explanation, to have good powers of comprehension. We briefly considered the relation of apprehension to assimilation, and regarded the former as a substitutive process preparatory to, or supplementary to the more direct and first-hand incorporation of new items of experience involved in the latter. If, however, we regard the relation of comprehension to apperception from a similar standpoint, we shall find that the signification of the two terms is often nearly identical. For unless we limit in some way the definition of apperception, for example to original thought and research, the two names seem to stand for the same mental process. This arises from the close and intimate

connection of language and thought. A body of practical experience can be built up (and much of our eminently useful acquaintance with the surrounding world is as a matter of fact so built up) without any aid from words and language. But for our system of knowledge we are very largely dependent on this aid. Language is an indispensable tool for the fashioning of thought—both in its individual and its social development. So that very much of our apperception can only be effected through the comprehension of oral or recorded explanation. Still it is well to retain the two terms, though their significance may so nearly, or in some cases completely, coincide. For just as description is an aid to more perfect assimilation through direct and first-hand experience, so is explanation an aid to the more fully and completely personal and individual activity implied in apperception. To one who already apperceives, through the system of knowledge which has become part and parcel of his mental being, explanation is unnecessary. It is just where the system of knowledge is incomplete and inadequate that explanation supplements and strengthens it. But it often happens that we comprehend perfectly what is explained to us to-day, and yet to-morrow, or next week, shall require to have the matter again explained. This is because the supplementary part of the system which the explanation provided was not intimately and thoroughly incorporated in *our* system, so as to be bone of its bone and flesh of its flesh—a living organic part of its mental tissue. If, then, we desire to crystallise out this distinction, we may say that, in so far as comprehension concerns only supplementary additions to our system of knowledge, not fully incorporated therewith, it falls short of thorough apperception; but that in so far as an explanation, given to us

perhaps by some expert, contributes to the organic growth of our scheme of ideational construction, its comprehension is merged in the higher and more complete process of apperception to which it ministers.

I have illustrated simple and direct inference, and likened it to interpolation on a graphic curve. But in many cases inferences are reached by disclosing *properties* not at first sight obvious, which are implied by our ideal constructions. Thus geometry discloses step by step all the essential properties of the triangles, circles, or other figures with which it deals. So well ordered is its procedure that it is taken as the type of exact reasoning. It exemplifies those characteristics of methodical procedure which Mr. Welton sums up by saying that it "omits nothing, takes up the points one by one, and takes them up in such an order that it goes from the starting-point to the fulfilment of the purpose by consecutive steps, each of which is seen in its true relation to every other, and to the inquiry as a whole."

Fallacies of method generally arise from failure adequately to grasp the relation between the starting-point and the conclusion, and from deviations in the true logical course between the one and the other. The question is often asked, What are the chief fallacies to which children are prone? I find this a difficult question to answer. Presumably little children, though they make many mistakes, are scarcely at the ideational stage wherein the term "fallacy" is properly applicable. The word "because" is often used by them without any clear understanding of its logical significance. The child simply finds it a handy conjunction, which is often used by his elders, e.g. "I've been out for a walk, because I've picked a lot of daisies"; "I saw the stars shine, because the moon was there." No doubt such cases, which show a vague realisa-

tion of some connection, may pass into the fallacy to which we are, all of us, liable—*post hoc ergo propter hoc*. Events are continually following each other. They are linked in customary experience; and the word “because” is a convenient word by which to name the fact of sequence, little more. The idea of causation is in children very vague: as it is in uneducated folk. A fisherman on the south coast complained that the weather had been bad because “it hadn’t no chance against that there glass,” pointing to a Fitzroy barometer. I don’t suppose he could have given any explanation of a connection which practical experience showed to exist. A yokel will tell you that he killed a slow-worm because it stings. There is a mistaken identification of the limbless lizard with snakes; and the word “sting” is used for the bite of a snake. He fails to distinguish, and uses words wrongly. But it is scarcely a fallacy; for it is scarcely a reasoned conclusion. Children, like the rest of us, make the mistake of connecting by “because” different modes of making the same statement. The boy says: “Arithmetic is rot, because it is rotten stuff.” But even his teacher may inadvertently remark that German is more difficult than French, because it is less easy to master. Neither of them is consciously taking the attitude of serious reasoning. Still the germs of fallacy are present. They are further developed if the pupil or his master gives irrelevant reasons for conclusions to which they are already committed, *e.g.* Latin has no value as a school discipline, because little or no use is made of it in after-life. Again, children, like the rest of us, jump too rapidly to conclusions based upon insufficient data, and apply them carelessly and thoughtlessly. I asked a boy what he had learnt that day in his science lesson. He at once replied, “All bodies expand when heated.” I found that he had seen the well-known experiment with

Gravesande's ring, and had been shown the expansion of mercury in a thermometer. The only other example he could adduce was that water, frozen in a tightly-corked bottle, broke the glass because in becoming ice it expanded! Many of our common words are used in more senses than one, and mistakes arise from this cause. Human laws or enactments imply a law-giver; but scientific laws or generalisations are universalised statements of observed facts. We must not, therefore, say that scientific laws imply a Divine law-giver. The conclusion may be true; but it cannot be shown to be true by using one word in two senses. If we say that mice are rodents, and therefore have chisel-shaped incisor-teeth, we must remember that "mice" in the statement does not include "shrew-mice," which are not rodents. I suppose the chief things for teachers and others to bear in mind are—(1) to guard against all forms of ambiguity in the use of words; (2) not to pass lightly from "some" to "all"; (3) to make quite clear what has to be proved, and from what grounds the proof proceeds; and (4) to keep within the argument, being especially careful in the use of analogy and illustration.

CHAPTER IX

THE ÆSTHETIC APPEAL—ENGLISH LITERATURE

IN the last chapter we dealt with the logical appeal to the individual mind as rational. When explanation and apperceptive assimilation have fulfilled their function, personal beliefs are brought in line with the systematic knowledge of the community at large. It is part of the aim of educational procedure to contribute to this end. But education should bring the developing mind into vital touch with the whole environment. And within that environment there is much which should appeal not only to the cognitive, but also to the affective side of our complex nature. The attitude of *appreciation* is not less important than those of apprehension and comprehension.

The term "appreciation" implies a realisation of value for some purpose; and it may be taken also to imply some response to the affective or the æsthetic appeal. Our interests are stirred, and we are pleasurably moved. To appreciate an argument is not only to acquiesce in its logical validity, but to feel that it is well put. Both in its cognitive aspect, and on its affective side, our mind is enriched. Even in the more specifically intellectual disciplines, therefore, it should be part of our aim to foster the development of an appreciative attitude. But it is in the realm of art—in architecture, sculpture, painting,

music, and literature—that the æsthetic appeal reaches its highest expression. No opportunity should be missed of bringing our pupils into vital touch with this part of their environment. And in nature-study the æsthetic appeal should not be neglected. It is, however, in literature, including all forms of harmonious expression, through language, of experience and thought, of feeling and emotion, and predominantly in our own literature, that the teacher finds the most abundant material through which to foster the germs of appreciation.

There would seem to be some people who, in adult life, have little or no appreciation of literature. They see, for example, nothing particular to admire in Tennyson's beautiful lines—

“And Morn
Has lifted the dark eyelash of the Night
From off the rosy cheek of waking Day”;

or in such lines as Lowell's—

“The rich buttercup
Its tiny polished urn holds up,
Filled with ripe summer to the edge.”

And if they do not feel the beauty of such passages, what can we do? It will certainly be of little avail to try to describe and explain—even if it admitted of explanation—wherein the beauty lies. He who is wise will change the subject. But with children it is our duty to foster their appreciation. And fortunately there are few children in whom there are no germs of appreciation which may be so fostered. In most cases the absence of receptive imagination in grown-up people is due to the fact that in them the germs have never been cultivated, or the young shoots of imaginative appreciation have died down and withered in the sterile soil of their daily life. But the

ministry of the teacher is here peculiarly difficult; for what the child is capable of appreciating is often very different from what the teacher himself appreciates. Certain it is, however, that if the teacher have never cultivated his own faculty of appreciation, he will be little able to render efficient service to his pupils in this respect. Hence his aim should be so to establish a mental attitude of appreciation in himself that he may be able insensibly to influence in a similar manner the minds of those who are committed to his care.

Fortunately children are by nature imaginative beings. They revel in stories, fairy tales and such dramatic episodes as fall within the range of their apprehension and comprehension, and can be emotionally interpreted. Since they are near the perceptual level of mental development, they are chiefly interested in concrete situations and the stir of active behaviour. Simple and direct motives are within the range of their dawning comprehension. And they are quite capable of appreciating a well-told story or an effectively developed fairy tale, though they may be quite unable to state the grounds of their appreciation. We often hear it said that they are rather severe and exacting critics.

But in saying that children are imaginative, appreciative, and critical, we are using these terms with a somewhat vague connotation. Their significance varies with the context.

The broadest definition of "imagination" would be any form of mental process involving images or imagery in the product. When the song of a lark, heard overhead, leads one to picture the bird fluttering and soaring, it is a case of imagination. It is here, however, little more than a re-presentative reproduction of what has on some previous occasions been presented to experience, and

is due to suggestion dependent on foregoing association. We must, no doubt, remember that re-presentation is seldom the exact copy of presentation, in all its details; still it is substantially similar. But with increasing complexity of experience there occurs more or less dissociation and recombination of the factors. This is familiar in reverie and in dreams. New products may thus arise, and imagination is raised to a higher level. The process is, however, rather spontaneous than volitional: it may arise within the perceptual stage of development. Of this kind are many of the imaginative products of children. They are characterised by the relative absence of purpose or end; or rather let us say such purpose as there is, is in and for itself, self-sufficing, and is not subservient to some higher synthesis or ideal construction. That is distinctive of imagination when it comes to the maturity of its powers. It is then termed *creative imagination*. It may be inventive when the purpose lies within the universe of practical utility; or scientific when the universe is that of systematic knowledge and interpretation; or artistic when it is that of æsthetic appreciation. These classes are indeed by no means mutually exclusive; still in each case the "universe" imposes certain restrictions. The successful inventor imagines a combination of mechanical contrivances that will work; the man of science calls in the aid of imagination in the framing of hypotheses which may be submitted to the crucial test; if the imaginative products of the artist are not consistent within the universe of his creation, they stand condemned. Only fancy can afford to laugh at the restrictions imposed on her more serious sister, imagination. Creative imagination at its highest and best is a rare gift. It has given to the world much that is of priceless value. We do not very often meet

with it in school or college life. Our function is rather to train the *receptive imagination*. This stands in the same relation to creative imagination that comprehension does to explanation. It is a form of æsthetic assimilation. This we can do something to foster.

The creative imagination of the poet is quite lost upon the reader or hearer who has no kindred receptivity. Hence the appreciation of imaginative literature presupposes a faculty which shall go out to meet and embrace the creative product of the artist. People of little imagination regard the similes and metaphors of the poet as far-fetched and extravagant. Why should Tennyson speak of the "dark eyelash" of the night, or the "rosy cheek" of morn? What could have induced Lowell to call the flower of a buttercup an "urn," and to say that it was filled with "ripe summer"? For the lack of imagination in many of us—especially men—education rather than nature is in large degree answerable.

What, then, is the relation of imagination to conception? It is a somewhat subtle one. No one can be a great inventor, man of science, artist or man of letters, unless he have both. And the greatest is he who has both in due proportion. The products of conception are general and abstract: the products of imagination are concrete and particular. The function of imagination is therefore to give concrete embodiment to the generalised results of abstract and conceptual thought. The things and processes, the men and women of our daily experience afford the material from which, by analysis and synthesis, our conceptions of the world and of human life are sublimated in the process of thought. The imagination of the artist gives to these conceptions re-incarnation; and in sculpture, the Apollo Belyidere; in painting, the Sistine Madonna; in literature, Hamlet are presented. But between the creative

imagination of Shakespeare and the receptive imagination of an appreciative audience, Mr. Forbes Robertson may stand as intermediary interpreter.

As with imagination, so too with appreciation, there are stages of development. In a broad sense we may apply it to any affective state which affords pleasure or satisfaction. Thus a dog appreciates the warmth of the fire, a child the tinkle of a bell. But the little girl who appreciates a good fairy tale has probably reached a higher level. There has grown up in her mind a standard of excellence in such matters, and when she says the story is a good one, she expresses a judgment. She applies to her affective states cognitive methods of comparison. She has formed an ideal of what a fairy tale should be. In all probability she could not formulate the nature of her ideal or the grounds of her judgment. Few of us, who are not trained in the canons of literary criticism, can do so. Our judgments are like those of daily life in cognitive matters. There we are wont to accept statements if they fall on a very vaguely formulated curve of our experience or knowledge. We do not, as a rule, apply anything like a logical syllogism. So, here, the literary ideals that grow up in our minds form the basis of our common everyday judgments, but remain for the most part quite undefined. If I say that the following lines of Mr. Rudyard Kipling's *Seal Lullaby* are excellent in their kind, I express a literary judgment:

"Where billow meets billow, then soft be thy pillow,
Oh, weary wee flipperling, curl at thy ease!
The storm shall not wake thee, nor shark overtake thee,
Asleep in the arms of the slow-swinging seas!"

I am not aware, however, of having formulated any generalisation of what the peculiar excellence of a seal lullaby should be; and I certainly am not prepared to

throw my conclusion into logical form. And this would seem to be characteristic of æsthetic judgments in general. It is true that we can formulate some few canons of æsthetic criticism. But they do not go far to help us. And if someone asks me, "Why do you regard these lines of Rudyard Kipling's as excellent in their kind?" I can say but little in reply. And I shall feel that this little is altogether inadequate. It is quite possible, moreover, that my own individual ideal may not coincide with what may be termed the *social ideal*—using this term for the ideal of those among us who from their refined and highly trained faculty of appreciation are best fitted to give an opinion in questions of literature. And this fact—that there is no absolute uniformity of ideal—serves further to illustrate the distinction between literary and logical judgments.

Both logic and æsthetics have for their aim the establishment of formal canons of criticism. Each, in its appropriate field, is the afterthought to insight. We form our opinions in matters of fact and matters of taste by no strict rules of procedure. But we may justify them at the bar of reason by such rules. That is the function of logic in the criticism of the intellectual appeal; and of æsthetics in the criticism of the literary ~~or~~ other appeal in the realm of art. The first stage of appreciation, then, is the direct experience of pleasure or satisfaction; a second stage involves a judgment in reference to a standard or ideal which does not go much further than a perception that the particular case reaches or falls short of the standard; and the third stage is that of critical appreciation in accordance with canons of art, which can be more or less definitely formulated. Those disciplines which are concerned with ideals are termed normative sciences; such as logic, which

has reference to correct inference and reasoning; æsthetics, which has reference to beauty of thought or expression; and ethics, which deals with right conduct.

Now we must remember that the affective part of a child's nature is in no way separated off from his cognitive faculties. Appreciation cannot possibly be developed independently of apprehension and comprehension. Language is an expression of experience and of thought, but also of emotional attitude. And with the child we begin by helping him to render the sentences, which he already understands, and by which he communicates with others, clear and accurately expressive. Analysis comes later. From the very first, in dealing with simple sentences, we should endeavour to quicken his sense of the music of speech, his feeling for melodious rhythm, and his appreciation of the harmony which results from the consonant accord between experience or thought or emotional mood, and its fitting expression. In due course this leads up to the æsthetic discipline, which is gained through reading aloud and recitation.

In our elementary education a good deal of stress is rightly laid on recitation. This affords material in and through which appreciation may be trained. But the mere getting by heart of the poetry which is recited is in educational value the least important part of recitation. At first, no doubt, the child must devote all his efforts to learning his piece by rote. But the true criterion of excellence in recitation is not merely that it should be word-perfect, but that it should show that the reciter has entered into the spirit of that which he recites. And he should be made clearly to understand that correct manner and method are certainly not less important than correct matter. Here demonstration is of far more service than description. The teacher

must himself be able so to recite or read as to show how the spirit of the piece may be brought out. At first the manner and method of the child will have little individuality; they are based, through imitation, on the manner and method of the teacher. But it is surprising how soon the individuality of the child makes itself felt; and such individuality should be encouraged so long as it does not run into mannerism. As the pupil thus becomes independent of the teacher, he is able more and more clearly to show the extent to which he appreciates that which he recites.

To the recitation of poetry should be added practice in reading aloud, not only poetry of varied metre, but good literary prose. Thus fresh material will be supplied on which the developing faculty of appreciation may be exercised. The usual plan in many English secondary and public schools is to drop all recitation and reading of the literature of his own language just at the time when the boy's appreciation is so far developed as to enable him to enter into the spirit of the work of the best masters. It is true that a play of Shakespeare or one of the "Idylls of the King," or other set piece is prepared with the aid of copious notes; and an examination is set which deals with text and notes. But from the nature of the case the examination paper deals with them *almost entirely in their cognitive aspect*. Look through such a paper, and what do you find? A series of questions set, apparently, with the object of ascertaining how much general information concerning the subject-matter of the piece, or suggested thereby, the boy remembers. All this is, no doubt, useful. But it is no test of literary appreciation—a matter which no examination paper can adequately gauge, and hence a matter too apt nowadays to be neglected.

"Suppose," says Mr. Crothers in his charming book, *The Gentle Reader*—"suppose these lines from *Paradise Lost* to be taken for study:

'Thick as autumnal leaves that strow the brooks
In Vallombrosa, where th' Etrurian shades,
High over-arched embower, or scattered sedge
Afloat, when with fierce winds Orion armed
Hath vexed the Red Sea coast, whose waves o'erthrow
Busiris and his Memphian chivalry.'

"What an opportunity this presents to the school-master! 'Come, now,' he cries with pedagogic glee, 'answer me a few questions. Where is Vallombrosa? What is the character of its autumnal foliage? Bound Etruria. What is sedge? Explain the myth of Orion. Point out the constellation on the map of the heavens. Where is the Red Sea? Who was Busiris? By what other name is he known? Who were the Memphian chivalry?'

"Here is material for exhaustive research in geography, ancient and modern, history, botany, astronomy, meteorology, chronology, and archaeology. The industrious student may get almost as much information out of *Paradise Lost* as from one of those handy compilations of useful knowledge which are sold on the railway cars for twenty-five cents. As for the poetry of Milton, that is another matter."

The difficulty is, that with young folk in their pupilage we have to help them to comprehend as well as to appreciate. No doubt our system of examinations tends to make some of us lay too much stress on information. The important point to remember is that to impart knowledge is not the primary function of a poet or his interpreter.

It forms, however, no part of my present purpose either to criticise existing methods of education or to suggest practical reforms. I can but indicate what appears to me necessary for the training of faculty. The problem is: Given a faculty of appreciation, which answers on the part of the recipient to the creative faculty on the part of the literary artist, how are we to train it? By all means let us render assistance in the apprehension and comprehension of that which our author has written. In this we cannot be too thorough. But, after all, it is not herein that appreciation lies. Nor can we expect a boy to describe his appreciation; as well ask him to describe his appreciation of a fully ripe peach. But we may expect him to give expression to that appreciation through the reading of selected passages from his author. And we may and should teach him so to use his faculty of speech as to reflect the beauty of the literature he appreciates. Thus only can he show us how far his receptive imagination answers to the creative imagination of the author he interprets.

Literary form appeals primarily to the *ear*, and we should endeavour to cultivate a due sense and appreciation of the melody of literature. Even when we read to ourselves, the element of sound is not absent, but accompanies re-presentatively that which is presentatively given to the eye. In early days, before the invention of printing, the appeal of the poet was mainly to the ears of an audience; now it is more largely to a circle of readers. And since the eye can take in a more complex and longer sentence than the ear—since, too, the reader in his study can pause and go over a passage again if he have not caught its rhythm or its meaning—some modern poetry has become too complicated and involved for the ear to follow. Few, for example, could grasp on first hearing,

or indeed on first reading, the following passage from "Sordello":

"While
Crowd upon crowd rose on Sordello thus—
(Crowds no way interfering to discuss,
Much less dispute, life's joys with one employed
In envying them,—or, if they ought enjoyed,
Where lingered something indefinable
In every look and tone, the mirth as well
As woe, that fixed at once his estimate
Of the result, their good or bad estate)—
Old memories returned with new effect."

Judged by the appeal to the ear, such a passage stands condemned. And, at any rate for the purposes of education, the appeal to the ear is the surest criterion of excellence in literary form. The appeal to the ear, however, involves an appeal through the voice. Hence the great and, in secondary education, too little recognised importance of reading aloud. I revert to this because it is, in my judgment, of great value in the training of the faculty of appreciation, while it is also a delightful accomplishment. How few Englishmen of average education are capable of reading effectively a passage in prose or verse so as to bring out its rhythm and melody, its delicacy or its force. And though a man's powers of elocution are not necessarily an index of his faculty of appreciation, yet this is the most expressive means at his command for showing his appreciation. If, too, there is any truth in what has before been urged, that language and thought develop hand in hand, we may fairly expect that appreciation and its expression should so act and react upon each other as to facilitate the concurrent development of both.

We cannot here consider at any length how the child should be trained to use aright his gift of speech for purposes of reading and recitation. As before noted,

demonstration is here of far more value than description. The child must be shown—not told—how to read well. The articulation must be clear and distinct, free from provincialism and mannerism. Rate of utterance and emphasis must be duly graded. And the melody of intonation must subtly indicate a sense of harmony between the thought and its expression. Sing-song in repetition or reading must be checked at all hazards. Unfortunately, much of the simple poetry for children lends itself all too readily to sing-song. Hence the pupil should be taught to read prose with due intonation. It is easier to read well good blank verse than the rhymed couplet. The pupil should also be taught to distinguish clearly between the rhythm and melody of poetry and that of prose, and should be led to feel that the difference lies a good deal deeper than the way in which the lines are written or printed. A prose author may consciously or unconsciously fall into the rhythm of poetry—a fault from which even Dickens is not free. Mr. Blackmore, for example, in *Lorna Doone*, writes: "All that in my presence dwelt, all that in my heart was felt, was the maiden moving gently, and afraid to look at me." This is not true prose melody, but the rhythm of verse. On the other hand, uniformity in the length of the lines does not constitute poetry, though some definite schematic sequence is almost, if not quite, essential. The American poet Walt Whitman shook himself almost entirely free of all the trammels of metre. Both in thought and expression much that he wrote has great beauty, but it is difficult to read aloud effectively. I may perhaps be allowed to quote one short piece:

"Had I the choice to tally greatest bards,
To limn their portraits, stately, beautiful, and emulate at will
Homer with all his wars and warriors, Hector, Achilles, Ajax,

Or Shakespeare's woe estranged Hamlet, Lear, Othello—Tennyson's fair ladies—

Metre or wit the best, or choice conceit to wield in perfect rhyme,
delight of singers ;

These, these, O sea, all these I'd gladly barter
Would you the undulation of one wave its trick to me transfer,
Or breathe one breath of yours upon my verse
And leave its odour there."

Here, where he is most effective, in the last four lines, he departs least widely from the traditional poetic form.

The pupil should always be allowed to read over carefully to himself any passage he is expected to read aloud effectively. It is quite impossible for him fully to perceive the harmony between expression and thought as he reads at sight. Take, for example, the following five lines from a well-known sonnet of Wordsworth's, which are admirable in their delicate harmony :

"It is a beauteous evening, calm and free ;
The holy time is quiet as a Nun
Breathless with adoration ; the broad sun
Is sinking down in its tranquillity ;
The gentleness of heaven broods o'er the sea."

It is not likely that the words "breathless with adoration," or the last line, with its lingering emphasis on the word "broods," will be rendered with due effect if the reader has no previous acquaintance with the poem. Nor can he catch the spirit of this introduction if he has no foreknowledge of the sequel. Reading at sight is indeed a most useful accomplishment, which should be separately trained. It involves in marked degree a division of attention between the comprehension of the matter and its effective rendering ; for the comprehension of the meaning as we read at sight is some way ahead of the vocal expression. But this very division of the attention prevents the

expression from attaining anything like its maximum value. It may be useful, therefore, to be able to read a poem or a piece of music at sight; but it should be understood that this is no fair criterion either of appreciation or of powers of expression. What should we say of an artist who came forward to read or sing in public, and who gave us a mere at-sight rendering? But no artist worthy the name would willingly consent to do such gross injustice both to himself and to his audience.

All this illustrates the need of preparation in the field of appreciation as in that of cognitive assimilation. As we have seen to be the case in all interest and attention, so also here, the relation of that which is in the focus of consciousness to the mental background in which it is set, forms an important factor in æsthetic tone. This is well seen in the employment of that which is known as suspense. Here a series of minor relationships are presented so as to prepare a background in which the emphatic relation shall be set. An example from Macaulay's Reform Bill speech may be taken in illustration: "If, sir, I wished to make such a foreigner clearly understand what I consider as the great defect of our system, I would conduct him through that immense city which lies to the north of Great Russell Street and Oxford Street—a city superior in size and in population to the capitals of many mighty kingdoms; and probably superior in opulence, intelligence, and general respectability to any city in the world. I would conduct him through that interminable succession of streets and squares, all consisting of well-built and well-furnished houses. I would make him observe the brilliancy of the shops, and the crowd of well-appointed equipages. I would show him that magnificent circle of palaces which surrounds the Regent's Park. I would tell him that the rental of this

district was far greater than that of the whole kingdom of Scotland at the time of the Union. And then I would tell him that this was an unrepresented district.' Note how the background of consciousness is here prepared for the final emphatic statement. And note, in passing, how skilfully the author particularises and brings the picture home to the eye through his description.

Nor is it only in the employment of the figure of suspense that the influence of the mental background, duly prepared, makes itself felt. We all know how some particular line of a poem, or speech in a play, or scene in a novel fails to carry its due force if torn from its context. Its full weight and beauty is appreciated only when the mental background has been prepared by what has gone before. How much even Portia's splendid outburst, beginning

"The quality of mercy is not strained,"

loses, if Shylock's question, "On what compulsion?" be not borne in mind. Or, to give but one further example, how tame and trite, taken by itself, is the line:

"And never lifted up a single stone!"

And yet, as the line stands in Wordsworth's idyll *Michael*, it is, at any rate to my appreciation, one of the most profoundly touching and pathetic lines in the whole range of our literature. Few who have entered into the spirit of the poem could read it aloud without a break in their voice.

We have all probably felt the thinness, so to speak, of the earlier chapters of a novel, especially on first reading. There is as yet no mental background which in any way bears upon the facts which are described, and in which those facts can find their appropriate

setting. On the other hand, our fullest appreciation of a novel or drama is when we review it in memory. The series of events are seen foreshortened in remembrance; the minor events retire into the dimmer background; while the salient features of the development stand out clearly in their due relations, the perception of which is accompanied by the æsthetic tone of appreciation. Thus, too, in a sister art, Mozart speaks of "seeing the whole of it" (a piece of music, even a long one) "at a single glance of my mind"; and adds: "The best of all is *the hearing of it all at once*." For the purpose of appreciation in retrospect, it is important that there should be a single definite development to which minor series of events are subordinate. When there are several co-ordinate series, not duly related, the effect on the mind is confusing. We say that the novel is wanting in artistic unity. *Silas Marner* is an admirable example of such artistic unity; Thackeray's *Virginians* being wanting in this respect.

The subject-matter of literature is as varied as are human interests. In it are reflected all the aspects of external nature that appeal to us as human beings, all the phases of human life and endeavour, and all the yearnings and passions of the human soul. All that we see and know, all that we hope and believe, all that we fancy and imagine, are reflected in literature. It is quite impossible, therefore, to define literature as a whole by its subject-matter. Nor is this subject-matter in any way definitely marked off from that of science. Neither literature nor science can claim a monopoly of any group of natural phenomena. Man and nature afford subject-matter to both. And last century witnessed science, on the one hand, endeavouring with increasing success to justify the application of its canons to the

study of man, and literature, on the other hand, turning with increasing sympathy for inspiration to the realm of nature. It is not in their subject-matter, broadly considered, that literature and science differ, it is in their attitude and spirit and purpose.

Now, since different men and women have different interests, and derive their pleasure from different sources, there are many kinds of literature. Nor is there one kind of literary excellence, but many. This is implied by the adjectives we use: sublime, majestic, grand; tender and pathetic; exciting, thrilling; humorous, witty, comic; and so forth. We do not, or should not, apply the epithets "beautiful" and "pretty" to the same piece. And this implies a variety in our appreciation. The same kind of literature does not appeal in like degree to all of us, nor indeed in the same way to any one of us in his different moods. These facts must be steadily borne in mind by the teacher. He must remember that what appeals strongly to him at his stage of mental development may not appeal at all to his pupil, who is at an earlier stage. If he attempts in any way to force upon an immature mind an appreciation unsuitable to its stage of development, he may either prejudice the pupil for life against that type of literature, or encourage a sham appreciation, than which nothing is unfortunately more common or more silly. What he has to do is to educate the appreciation, leading it on step by step in its upward development. He must remember, too, that his aim is to minister to all-round mental development. He should endeavour to cultivate an appreciation of literary excellence in all its phases. The majestic verse of Milton and of Wordsworth at his best; the polished excellence of Tennyson, and the concentration and dramatic power of Browning; the broad

humanity of Shakespeare and of Scott; the humour and pathos which find such different expression in Thackeray and Dickens; the strength of George Eliot and the delicacy of Elizabeth Browning; the word-painting of Ruskin and Carlyle, the wit of Tom Hood and the delicate humour of Charles Lamb,—all these should have their chance of appealing to a mind that has had an all-round education in appreciation. And since we must distinguish between our lower and our higher interests; between the pleasures which are mean, trivial, or sordid, and those which are ennobling and appeal to what we feel to be the better side of our nature; so we should encourage our pupils to appreciate best that literature which appeals to lasting and enduring interests, to those pleasures which are ours in virtue of our distinctive humanity.

Although it must not be pressed too far, we can scarcely avoid drawing a comparison between literature and science. The primary aim and object of science is to explain phenomena; its excellencies are accuracy, organisation, and rigid logical sequence. It might be described as a concatenation of "therefores." On the other hand, the aim and object of literature is to evoke emotional tone, to appeal to our sense of the beautiful, the grand, the tender, the pathetic, the humorous. Its excellencies are melody, harmony, artistic unity, beauty of thought and expression. It is not a concatenation of "therefores," but a sequence insensibly enchained by a delicate suggestiveness. It depends not so much on logic, though logic may be insensibly present, as on insight. The one is primarily cognitive and intellectual; the other concerns the emotional aspect of states of consciousness. But by this it is not meant that science is intellectual and literature merely emotional.

The best literature is often splendidly intellectual; the loftier scientific truths stir some of us with a profound emotion. The point is, that the primary aim of the man of science is intellectual and cognitive; while the primary aim of the man of letters is æsthetic and emotional. The one interprets nature under the forms of the intellect; the other interprets nature under the forms of æsthetic tone. The one strives to make his atmosphere perfectly clear and transparent; the other chooses the veiled tints of sunrise and sunset, the reflected lights of the clouds, or the half-revealing, half-concealing radiance of night. Not that the poet's atmosphere is of necessity misty or vague; it may be so transparent that every minutest detail of his landscape is clearly visible. What could be more pellucid than the atmosphere of this little picture of Coleridge's?

"There is not wind enough to twirl
The one red leaf, the last of its clan,
That dances as often dance it can,
Hanging so light, and hanging so high,
On the topmost twig that looks up at the sky."

But whereas the man of science has no choice but to work under the conditions of the greatest possible intellectual lucidity, the man of letters is free to choose the conditions which conduce to the highest artistic effect.

It is a mistake, however, to regard science and art as antithetical. The man of science is, or should be, an artist. His art-work is the interpretation of nature, in its widest sense, under the forms of the intellect; just as the art-work of the man of letters is the interpretation of nature under the forms of æsthetic tone. Man of science and man of letters are both creative artists. It is not science and art that are antithetical; but the

art-work of science, and the art-work of literature, appealing as they do to different aspects of our mental nature. But if they are antithetical, they are not, or they need not be, antagonistic. No doubt a man may, by exclusive devotion either to literature or to science, starve down the other side of his nature and become lopsided. It is our aim in education to prevent such lopsidedness. And there is in modern times a danger—a real and very ominous danger—that the growth, not so much of science as of what we may term scientism (which may be defined as science minus the artistic ideal), may conduce to the development of a specific class of lopsided scientists. All who have the interests of true education at heart should be alive to this danger. Technical instruction is of great value; but it cannot afford that all-round training and discipline of the mental powers which is the aim of education.

Although, however, there is no necessary antagonism between literature and science, it is undoubtedly true that, either through nature or nurture, the same individual is seldom man of science and man of letters in equal degree. Nor is it desirable that he should be. But the man of science should at least have some sympathy with literature, and the man of letters some appreciation of the art-work of science. And whether he is primarily scientific or primarily literary depends to a large extent on the nature of the mental background. In man, as a rational being, this background is in large degree relational: in the man of science the aspect of the relations therein is primarily logical; while in the man of letters it is primarily æsthetic. In the one it is illuminated by the cold, clear light of reason; in the other it is suffused with the many-hued tints of emotion. And there is this difference between the method of presentation of his work

by the man of science and the man of letters—especially the poet. In an adequate treatise on science it is expected of the author to supply to a very large extent the background in which his conceptions are set. He has not only to give us his thought, but to exhibit with due diligence and care its relations, and its exact position in the scheme of knowledge. Not to do so is to fail in the art of scientific exposition. With the poet it is different. It is no part of his function to supply the mental background. That you must bring for yourself to the study and enjoyment of his work. And the fuller and richer your background, the more sympathetically will you respond to the poet's appeal. Hence the concentration and condensedness of poetry; hence the fact that it is suggestive rather than expository; and hence the fact that, if we have a poor thin background, Shakespeare, and those who sit nearest to his throne, will appeal to us in vain.

To draw but one more distinction between poetry as the flower of literature, and science as the embodiment of rational explanation, we may note that, since the artist must ever breathe the spirit of his art into the materials with which he works, we find that, for the man of science, all nature is instinct with reason; while for the poet the whole universe "trembles with song." As the poet from whom I borrow this expression—Mr. William Watson—sings it;

"Lo, with the ancient
Roots of man's nature
Twines the eternal
Passion of Song.

Ever Love fans it,
Ever Life feeds it,
Time cannot age it,
Death cannot slay.

Deep in the world-heart
Stand its foundations,
Tangled with all things,
Twin-made with all.

Nay, what is Nature's
Self, but an endless
Strife towards music,
Euphony, rhyme?

Trees in their blooming,
Tides in their flowing,
Stars in their circling,
Tremble with song.

God on His throne is
Eldest of poets;
Unto His measures
Moveth the whole."

I will add but one more remark on the relationship which we have been considering. It is this: that the teacher must never forget the cardinal fact—that observation, accurate and sympathetic, true-eyed and true-hearted, is the mother alike of literature and of science, and that just in so far as we too are observers, shall we be able to appreciate the art-work of science and the art-work of literature.

Since literature deals so largely with the emotional aspect of human life, it is in this field that the teacher desirous of making a psychological study of the emotions may seek his material. The emotional terms employed are very numerous, and each in its context carries wonderfully subtle shades of meaning. The emotions are proverbially difficult to classify; and emotional terms torn from their context lose the living force they possess when they stand for vital, mental attitudes in the continuous action of a moving drama. I can only suggest some of the questions

which may be asked. Does the subjective or the objective reference predominate? When we speak of a child as sulky it is the mental state of the child himself, as subject, to which we chiefly refer. But when we speak of a child as angry, we think also of some object of his anger. Is the objective reference to persons or to things? We may dislike either persons or things, but contempt generally implies a personal object. Does the word refer to a temperament (the melancholy Jaques), or a mood (in a happy vein), or a passing experience (surprise)? Is the subjective reference pleasurable or painful or mixed? Can you classify the emotions on this basis alone? Is the time-reference implied, wholly present, or partly also future or past? Hope has prospective reference; forgiveness and regret suggest retrospection; joy and uneasiness have little reference to past or future. Is the conative tendency active in some definite direction, as in anger; or restless and indefinite, as in anxiety; or quiescent, as in listlessness? Is it appetent, as in curiosity; or aversive, as in disgust? Is there an element of contrast with a preceding state, as in relief? And is the psychological level perceptual, as in the simpler forms of fear and anger; or is it characteristically ideational, as in contrition and awe? To these and other such questions the answer is generally a definite one when, but only when, the context is given.

One cannot but feel, however, that to use literature as a quarry for the extraction of psychological material is to detract from its pure enjoyment. After all, that is the attitude of mind to which it should minister. And the aim of the teacher should always be to bring his pupils into living touch with literature, so that they may go forth and pluck its sweet flowers and fruits under no compulsion and at leisure. "The first essential to the enjoyment

of poetry," says Mr. Crothers, "is leisure. The demon Hurry is the tempter, and knowledge is the forbidden fruit in the poet's paradise. To enjoy poetry, you must renounce not only your easily besetting sins, but your easily besetting virtues as well. You must not be industrious, or argumentative, or conscientious, or strenuous. I do not mean that you must be a person of unlimited leisure and without visible means of support. I have known some very conscientious students of literature who, when off duty, found time to enjoy poetry. I mean that if you have only half an hour for poetry, for that half-hour you must be in a leisurely frame of mind."

There is a subtle vein of paradox in Mr. Crothers which in itself is worthy of psychological study. It illustrates the distinction between the strictly æsthetic appeal and that which is formally logical. And since his point of view differs from that of the pedagogue, I shall quote one or two more passages from the *Gentle Reader*, leaving the teacher to bring them into line with his own practice.

"We usually accept poetry as mental discipline. It is as if the poet said, 'Go to, now. I will produce a masterpiece.' Thereupon the conscientious reader answers, 'Very well; I can stand it. I will apply myself with all diligence, that by means of it I may improve my mind.' Who has not sometimes quailed before the long row of British poets in uniform binding, standing stiffly side by side, like so many British Grenadiers on dress parade? Who has not felt his courage ooze away at the sight of those melancholy volumes labelled Complete Poetical Works? Poetical Remains they used to call them, and there is something funereal in their aspect.

"The poets who delight us with their verses are not

always serious-minded persons with an important thought to communicate. When I read

'In Xanadu did Kublai Khan
A stately pleasure-dome decreed,'

I am not a bit wiser than I was before, but I am a great deal happier; although I have not the slightest idea where Xanadu was, and only the vaguest notion of Kublai Khan."

"There are poems whose charm lies in their illusive-ness. Fancy anyone trying to explain Rossetti's 'Blessed Damsel.' Yet when the mood is on us we see her as she leans

'From the gold bar of Heaven:
Her eyes were deeper than the depth
Of waters stilled at even;
She had three lilies in her hand
And the stars in her hair were seven.'

"We look over the mystic ramparts and are dimly conscious that

'The souls mounting up to God
Went by her like thin flames.'

"This is not astronomy, nor theology, nor any of the things we know all about—it is only poetry."

"To understand poetry is a vain ambition. That which we fully understand is the part that is *not* poetry. It is that which passes our understanding which has the secret in itself. There is an incommunicable grace that defies all attempts at analysis. Poetry is like music; it is fitted not to define an idea or to describe a fact, but to voice a mood. The mood may be the mood of a very simple person,—the mood of a shepherd watching his flocks, or of a peasant in the fields; or, on the other hand,

it may be the mood of a philosopher whose mind has been engrossed with the most subtle problems of existence. But in each case the mood, by some suggestion, must be communicated to us. Thoughts and facts must be transfigured; they must come to us as through some finer medium.

"This is the characteristic of the poet's power. He does not construct a work of the imagination,—he makes our imaginations do that. That is why the fine passages of elaborate description in verse are usually failures. The verse-maker describes accurately and at length. The poet speaks a word, and, Presto! change! We are transported into a new land, and our eyes are 'baptized into the grace and privilege of seeing.' Many have taken in hand to write descriptions of Spring; and some few painstaking persons have nerved themselves to read what has been written. I turn to the prologue of the *Canterbury Tales*; it is not about Spring, it is Spring, and I am among those who long to go upon a pilgrimage."

"As there are poems which are not meant to be understood, so there are poems that are not meant to be read; that is, to be read through. There is Keats's 'Endymion,' for instance. I have never been able to get on with it. Yet it is delightful,—that is the reason why I do not care to get on with it. Wherever I begin, I feel that I might as well stay where I am. It is a sweet wilderness into which the reader is introduced.

'Paths there were many
Winding through palmy fern and rushes fenny
And ivy banks; all leading pleasantly
To a wide lawn.'

We are brought into the very midst of this pleasantness. Deep in the wood we see fair faces and garments

white. We see the shepherds coming to the woodland altar.

'A crowd of shepherds with as sunbarnt looks
As may be read of in Arcadian books.'

We see the venerable priest pouring out the sweet-scented wine, and then we see the young Endymion himself.

'He seemed
To common lookers-on like one who dreamed
Of idleness in groves Elysian.'

What happened next? What did Endymion do? Really I do not know. It is so much pleasanter, at this point, to close the book and dream of 'idleness in groves Elysian.' The chances are that when one turns to the poem again he will not begin where he left off, but at the beginning, and read as if he had never read it before, or rather, with more enjoyment because he has read it so many times;

'A thing of beauty is a joy for ever:
Its loveliness increases; it will never
Pass into nothingness; but still will keep
A bower quiet for us, and a sleep
Full of sweet dreams, and health, and quiet breathing.'"

CHAPTER X

CHARACTER AND CONDUCT

To the question: What is the aim and object of the ministry of the teacher? many answers are given. At the outset I said that one of the definitions of education is that it should afford a means of bringing the individual into vital touch with his environment. The child of to-day is the man of a future day in the making. We contribute in some degree to his making; but to the making of what sort of man? He should have practical experience of nature, of human folk, and of social products; his physical powers should be developed to the limit of their capacity, and his body maintained in a healthy condition; he should be skilful in manipulation; his intellectual faculties should be so exercised that he shall attain to, and shall be able to apply, systematic knowledge; his gift of appreciation of the beautiful in nature and in art should be cultivated; he should be fitted to play some special part in the community, and to perform wisely and well the general duties of citizenship. The list might be expanded into a volume entitled "The Ideal Man," or it might be contracted into the title of that volume.

Common to all definitions of education, however narrow or however broad, is the setting forth of some ideal to be striven for and, if it may be, attained. It is implied in all

definitions, that education should be a preparation for life, that is for right-living, which again indicates an ideal. From the point of view of this chapter the purpose of education is the development of character and conduct; but it must be the type of character and conduct of which we approve. And to reach this educational end certain educational means must be employed. But they must be the best means which we can devise; and directly we speak of the best means we are again in presence of an ideal. If we say that education should afford the best means of producing the best citizens we have a formula which, while it emphasises the ideal, is so vague as to be of little practical service. We must descend to detail. We must set forth this or that means for attaining this or that result as contributory to the end in view. We must analyse both our end and our means into its constituent factors. But no matter how minute our analysis, it is always an ideal means to an ideal end which we seek to disclose.

Now we must be quite clear as to what is meant by an ideal. There are some people who grow restive the moment the word is mentioned. They think that something unpractical, Utopian, and up in the clouds is intended; at any rate, something abstract and out of touch with concrete problems and business-like procedure. No doubt in a sense the ideal is abstract; but only in the sense that every general idea, every concept, and all knowledge is abstract. But it is not necessarily, and indeed never, should be, out of touch with concrete problems; and so far from being unpractical (if by this is meant divorced from active endeavour), that is just what an ideal is not. For that which we have in view is an ideal of what will conduce to educational progress, and this always is and must be some form of active endeavour. We have to

remember that all knowledge involves ideal construction; the adjective "ideal" here signifies that general and abstract ideas are the bricks with which the intellectual edifice is built. But the value of knowledge lies in its application to particular problems. An ideal of conduct is likewise something which we construct; as an intellectual edifice it is built of similar bricks. The conative aspect is, however, characteristically prominent. It is not only an *ideal* of conduct, but emphatically an ideal of *conduct*. One of the distinctive implications is that it contains within it a motive for action. This serves to link it closely with practice. The most effective ideals are those which are just ahead of what has been realised in practice, which may be realised by active endeavour, and the realisation of which is accompanied by the affective tone of satisfaction. Here then, as well as elsewhere, the aspects of knowing, feeling, and doing are combined. Through cognition the ideal is fashioned, through feeling comes the desire for its attainment, through conation and the exercise of volitional process the end in view is reached. And it is clear that, in ideals of conduct, the conative aspect, which implies a striving to convert the ideal into accomplished fact, is especially emphatic.

The sphere of conduct is that of the field of intercourse. What we understand by conduct is some form of human activity carried out in the midst of social relationships and guided directly or indirectly by volitional process or the exercise of the will. The first thing we have to realise is the importance of the social factor. It is, of course, sufficiently obvious that those varied forms of conduct, which are distinctive of the work of the teacher, are a mode of social service carried on within the body corporate. From this service we may take an illustration of what is technically termed differentiation and

integration. The teacher's calling requires special training. It is a differentiated product of social evolution. In the process of civilisation he has been set aside to perform certain functions which involve specific modes of conduct. Thus he has been differentiated from the professional men, tradesmen, or artisans whose sons and daughters he educates. But to enable him to carry on his work, their children must come to his school. The performance of his functions depends upon his standing in certain relations to the boys and, directly or indirectly, to their parents. He must establish, or there must be established for him, a connection. His differentiation from other members of the body politic involves the integration implied in such a connection; and the differentiation of his own specific modes of conduct involves their integration in close relationship with other specific modes of conduct. All conduct is subject to the law of social relativity; it is what it is not only in and for itself, but in relation to other modes of conduct; and it is this relationship which determines not only its nature, but more especially its value or worth for some end or purpose.

Hence the study of conduct involves the process of comparison. First we take the data of conduct as given in particular cases of actual behaviour. We analyse, compare, and then synthetically rebuild in an ideal construction. This affords a conceptual scheme of social conduct. We then compare the particular case and its relationships with an analogous case within the ideal scheme, and express a judgment of its accord or lack of accord. The case may be one of our own actual conduct or that of another. So far we have only the cognitional aspect. The affective aspect is a desire to bring the actual conduct into accord with the scheme of ideal construction. The conative aspect is the active endeavour to reach the desired result.

We have already seen that it is through comparison that general and abstract ideas are reached. We have now to lay special stress on the rôle which is played by what may be termed social comparisons. From first to last our ideas and concepts, all the products of our thought in ideal construction, are constantly compared with the similar products of others, or what we believe to be such. We utilise the integrating factor of imitation in order that we may bring the child or older pupil into line with, and close relationship to, social modes of thinking; in our efforts to foster originality and individuality we render fully conscious and purposeful the tendency to differentiating self-assertion in opposition to others. But the comparisons involved deal not only with the products of thought; they deal also with the process of thinking. This is a point of considerable importance and requires emphasis. It is part of our inherent self-assertion that we are all desirous of persuading others to accept and adopt our own conclusions in any matter which really interests us. But to do so we must pay attention to the process by which we have reached the conclusion in order that we may induce others to follow a like procedure, and thus to embrace a like opinion. The teacher, for example, must realise how he passed from a given starting-point through certain stages to a definite conclusion, if he would lead others along a like track to a similar goal. And he must help his pupils to realise the nature of their own mental processes. One result of these inevitable comparisons is, that every step in the oft-repeated and long-continued process renders clearer the conception of self, and renders clearer also the conception of other selves.

The matter may be presented in another way. We have seen that judgment is the acceptance or rejection of

a proposition (or that which may be expressed in a proposition) as a constituent part of reality within a given universe of thought or of discourse. But all day long we are constantly comparing such judgments with those which are formed by others. Only thus do they attain social validity in the field of intercourse. Educational procedure is full of such comparisons. The pupil's judgments have to be brought into accord with the judgments of others. But he must realise the nature of both and the differences between them before this is possible. Difficulties arise; and every difficulty involves a perception of dissimilarity between his own results and those of others. To overcome it is to bring process and product into social harmony. To grasp the nature of one's own difficulties and those of others involves comparison, involves attention to mental process so as to discover the exact point where the difficulty lies, and therefore involves a better understanding of the similarities and differences between self and other self. If, then, judgment implies acceptance in the name of reality, there is always the further implication that it is a reality which others share or may be induced to share. It is a reality with social reference.

But there is yet another group of comparisons which arise in the sphere of intellectual development. I have alluded to difficulties. Few teachers will question the assertion that the realisation of difficulties is essential to progress. How impotent we feel in the presence of dull pupils who never have any difficulties—which of course means that they fail to realise the presence of difficulties in the mental smudge, which, what ought to be a problem, presents to their mind's eye! In our despair we are almost tempted to say that this is a hopeless type of boy. Another well-nigh hopeless type is not unfamiliar. There are those who, while they can to some extent see a

difficulty,—for whom, indeed, it may assume undue proportions,—have little or no desire to overcome it. But fortunately there are also those who both realise the difficulty and are determined to overcome it. For this type there is abundance of hope. Now translate this into terms of self. A boy of this type feels that he is a baffled self, at present beaten by some problem; he contrasts this with a victorious self by whom the problem has been solved. This is the self he hopes and really wants to be. He has had experience of the passage from a conquered to the conquering self. In other words, he has had opportunities for comparison of the one with the other. And this group of comparisons of the self at one time with the self at another time has a very important place in intellectual and, as we shall see, in moral development. But it involves the conception of an ideal self—that is to say, an ideal construction of the self one is not as yet, but hopes to become. And there must be a real desire that the baffled now-self shall be transformed into the victorious then-self of ideal construction. Even in these individual comparisons, however, the social factor is generally present. We know to how large an extent emulation, as arising out of a subtle interplay of the imitative and self-assertive tendencies, quickens the desire for success. If others are successful, all the more reason for me to join their number. If others fail, then still all the more reason that I should show that one of us at least can master the problem.

We may now pass to matters of ethical conduct, bearing in mind, first, that they are forms of behaviour having social worth, and secondly, that they are closely related to the exercise of the will.

It will be remembered that perception always involves active behaviour. The meaning of a situation for practical

experience comprises what has to be done in response to what the situation presents, and what further presentations will be the outcome of the behaviour. Within the field of intercourse, however, the situations involve social factors; the child's dealing with them is in relation to the manner in which others are acting in their midst. And the child's behaviour is partly determined by his imitation of others, partly by his bias towards self-assertion in opposition to others. Which tendency predominates will depend, as we say, upon the child's character, and this in turn depends partly upon his hereditary proclivities and partly upon the circumstances of his life which have led to the repression of some and the free play of other inherited traits.

In all matters of behaviour which rises to the level of conduct, comparisons of the type which I have above termed social, are continually being instituted in the most varied ways, and are of the utmost importance. Probably in greater degree than any other comparisons, they contribute to the realisation of the self in its likeness to and its contrast with other selves. The little child at an early stage of development behaves in this way or that without paying much attention either to his manner of behaving or to how his behaviour is regarded by his companions and his elders. But not for long. His own acts as compared with those of others; how his own acts are regarded by others; how their conduct affects him and is estimated, soon form a fascinating group of subjects possessing a peculiar interest. He must attend to his own conduct in order to institute the necessary comparisons. He contrasts his own behaviour under different circumstances: that of his playmates and his parents or teachers in similar situations; what they think of him and what he thinks of them. As he thus becomes self-conscious, in the

more technical sense of the term, so does he also become self-conscious as the word is used in popular speech. He loses the spontaneous naïveté of relatively perceptual behaviour, and is troubled by thoughts of what others are thinking of his conduct. He is apt to pose and fall into tricks of self-display, or to be shy and retiring lest he should make himself conspicuous. His tendency either towards imitation or towards self-assertion is evident to the careful observer; and it is emphasised by the fact that he realises that he is under observation. His conduct shows subtle accommodations in accordance with different circumstances in the field of intercourse. Among his chosen companions, beneath his parents' or teacher's eye, at a party where the majority are older than himself, with a "lot of kids" who are privileged to enjoy the patronage of his presence, he is not one and the same boy, but four quite distinguishable beings.

Now the more we compare our own conduct at different times and under different circumstances, contrasting it with the conduct of others, and taking into consideration the way in which others regard it, the more material we have for estimating its value in relation to the purposes and motives by which human folk are actuated; and the more data do we possess for forming an estimate of its worth as contributing to the realisation of an ideal construction of social life. Such an estimate of any given action in its relation to an ideal of what ought to be done under the circumstances, involves a judgment of the ethical type. And the attitude assumed in such judgments is that of *approbation* or *disapprobation*. Here, too, there is generally a social supplement to our judgments. They are supported by their validity for others and for the community at large. Often they are supported by reference to some representative man who would, we

believe, express such and such a judgment with all the weight of his authority. A soldier whom I met some time ago told me that when he was a young subaltern, and was getting slack, as he expressed it, he was pulled together by a pithy but effective remark of his superior officer. "Take care," he said; "you're forgetting Wellington, and the history and traditions of the army." There's many a lad who has been spurred to his best endeavour, and restrained from a mean or ignoble act, by the flashing across his mind of the name and figure of one of his heroes in history or in fiction. A man of science, who himself did good work in physics, told me that whenever he scamped an experiment he saw the grave, reproving eyes of Faraday fixed upon him.

It must be remembered, however, that the majority of us, in the midst of the busy work-a-day life of the world, would find it exceedingly difficult, if not impossible, to define our ideals of right conduct, to formulate the principles on which our indefinite ideals are based, or to render clearly explicit the grounds on which we express a judgment of approbation or disapprobation either on the conduct of others or with regard to our own acts. We are content for the most part to say that we feel this to be right and that to be wrong, or that conscience decides the matter for us—sometimes adding that the less we meddle with conscience and try to explain its origin the better. Just as there has grown up in us insensibly a standard, often vague but quite serviceable, of literary excellence, and just as we frequently can do little more than affirm that this poem or novel somehow, and for some cause, approaches to or falls short of what seems to us first-rate; so too there has grown up in us, also insensibly, a vague but helpful standard of right conduct, though we can often do little more than affirm that So-and-so's conduct, we are quite

sure, is morally wrong, or regretfully admit to ourselves that our own act on such and such an occasion was not irreproachable.

The fact is, that the subtle influence of custom and authority has partly supplemented and partly been accepted as a substitute for our own individual ideational process. Although we are constantly comparing and contrasting, we do not carry out a systematic analysis, or recombine in a comprehensive ideal construction wherein the relationships of the several factors are clearly grasped, and can therefore be rendered definitely explicit. We are also largely under the influence of habit (of which more will be said presently), and do not pause to consider how the habit has been established. Indeed, we to a very large extent carry up into our life of behaviour and conduct the modes of procedure which are founded rather on perceptual than on ideational process.

Let us, however, consider the matter from the genetic point of view. It is part of our ideal that the pupil should, when he leaves school, be under the moral law. But what do we mean by being under the moral law? We express it otherwise when we say that he should act under a sense of moral obligation; or again, when we say that his conduct should be guided by a sense of duty; or yet again, when we say that he should obey the dictates of conscience; or once more, when we say that he should act in accordance with his intuitions of right and wrong. All these expressions imply that there should be established habits of right action, the performance of which is accompanied by moral satisfaction, and carry with it a sense of obligation—this, too, from no external constraint, but “wholly self-imposed.” How the sense of obligation arises, and what is meant by saying that it is self-imposed, we must now briefly consider.

From his earliest infancy the child is under subjection and authority. In numberless ways his behaviour is under external restraint. For long this is for him simply part of the unexplained nature of his environment. All his surroundings are acquiring meaning through perceptual process, and this is part of the meaning. Parents or nurse check some activities, permit others; perhaps punish when this is done and in some way reward when that is done. Brothers and sisters exercise in a different way a like controlling influence. Although the child's behaviour is thus moulded by the external constraint of others, there is at first probably no sense of obligation, as we generally understand the phrase, because the relation to others is as yet scarcely realised. Not only are his activities thwarted or permitted by other people, they are thwarted or permitted by everything around him—by hot things or sharp things which hurt, by cold things which make him shrink, by tables and chairs which bruise him, and so forth. He is constantly and restlessly behaving in this way or that in response to all that is presented to his dawning perception; some behaviour brings pain, other activities are pleasant in their results. Only gradually are things and persons distinguished from each other. Only gradually is the constraining influence of the one group dimly realised as different from the constraining influence of the other. Only gradually does there arise in presence of parents or others a special sense of "mustness" begotten of their peculiar restraining influence, felt to emanate from them as persons, and referred to them as its originating source. This is the germ of the feeling of obligation. It has its genesis within the field of intercourse; it is an essentially social factor in consciousness; and it inevitably involves an incipient awareness of how others regard the behaviour

for from them, as so regarding it, comes the "must" and the "must not."

But not only is he influenced by others, he is also both through imitation and in his self-assertion in some degree influencing them. As he gains a sense of "must" imposed by others on himself, so too does he gain a sense of "must" imposed by himself on others. He gets his own way (sometimes) and feels what it is like; more often, perhaps, he feels what it is like when others disregard his wants and his wishes. He experiences pleasure and satisfaction in the one case, pain and dissatisfaction in the other case. And he begins to project such pleasure and pain into the other self of parent or nurse, brother or sister. Affection quickens this sympathetic transference to and fro of all that he learns through self of others, and from others of self under the constant influence of the imitative and self-assertive tendencies. The "must" imposed by others is supplemented by an answering "must" from within. Herein are the germs of obligation as "self-imposed."

It must be remembered that in a sense all psychologically guided behaviour is self-imposed. If the child learns by experience that, in presence of the nurse, certain behaviour is followed by petting, while certain other behaviour is followed by slapping, it is his own experience that guides; and his own experience is psychologically only another name for himself. All his intelligent and perceptual behaviour is thus, in a sense, self-imposed. But when we speak of obligation as self-imposed we mean something more than this. We mean that it is in relation to a conception of self within an ideal construction of social conduct. Let us in illustration glance very briefly at the stages through which obedience may pass. The little child in the first instance learns to

obey, as does the well-trained puppy or colt. To do this or to stop doing that is in accordance with a "must" from without, emphasised by consequences. There is no wish to obey. It is not yet willing obedience. As sympathy gains ground, however, obedience is raised to a higher plane. Mother's distress at her child's disobedience counts for something—counts for more and more. The external constraint is supplemented by an internal factor of a new order due to the sympathetic transference of another's pain to the guiding experience. There is now a wish to obey, willingly and not from compulsion. It is the obedience of love and not of fear. The growth of this factor is educationally of the utmost importance. It marks the cheerful obedience of sonship through affection, in contrast with the perhaps sullen and in any case wholly constrained obedience of the slave. But gradually a concept of self in relation to parents and others grows up. That self is among other things an obedient self. The wish to obey is no longer entirely dependent on giving others pleasure which is sympathetically shared (though that factor continues); it is also dependent on the ideal self, to realise which is an object of desire. It is the wish to obey, because to obey is what you wish; you must obey if you are to satisfy your desire to be obedient; it is a categorical imperative addressed by yourself to yourself. The sense of obligation is self-imposed, just in so far as it is in relation to a conception of a self set in the midst of certain social surroundings.

If, then, we say that it is part of our ideal that the pupil, when he leaves school, should be under the moral law, we mean that conceptions of right conduct should be so identified with and made part of his nature that they will supply motives for conduct wholly irrespective of any other compulsion. The supremacy of the moral law,

the binding force of the categorical imperative, is the supremacy of the ideal construction over any partial and incomplete realisation in actual conduct, the binding force of a conception to which there attaches a genuine desire. The civil law of the land exacts a social minimum under certain penalties; the moral law, as self-imposed, exacts a social maximum in accordance with the ideal, under penalty of self-disapprobation speaking with the voice of conscience.

By motives the will is stirred to action. But what are motives, and what is the will?

Let us first try to reach clear conceptions as to the relation of impulse to motive. I suppose the distinction drawn in common speech is that motive involves deliberation, while impulsive action is spontaneous and swift, performed without careful weighing of the *pros* and *cons*. Such impulses may be good or bad when tried at the bar of ethical judgment. But whether good or bad their characteristic is that they are, as such, uncontrolled. A man walking by the waterside sees a child in peril of drowning, and instantly springs to the rescue; a high-spirited youth sees a girl insulted by a blackguard, and promptly knocks him down; a poor starving wretch sees a child carrying her father's dinner, and hungrily grabs it. These actions call forth in different degree our praise or blame; but they are alike in being impulsive. They are not the outcome of deliberate control. We sometimes speak, indeed, loosely of motives for such actions, saying that the poor wretch is impelled to his deed by motives of hunger. But it is well to reserve the term motives for the determinants of controlled action; and to speak, not of the motives, but of the promptings of impulse.

It will conduce to clearness if we consider their relation

from the genetic point of view. We come into the world with certain inherited tendencies to behave in certain ways. This gives us the initial instinctive responses to the appropriate presentations. Such performance, biological and physiological in its origin, being, as we assume, accompanied by consciousness, affords, together with the presentations, what I termed the primordial tissue of experience. But with the growth of perception, circumstances are dealt with in accordance with the meaning they have acquired through previous experience. The tendency to behave in any situation in accordance with the pleasure or the pain which is the affective tone accompanying its meaning for cognition, is that mode of consciousness which we may term a *primary impulse*. In intelligent behaviour, then, on the perceptual plane of mental development there is a primary impulse to complete that situation with which pleasurable affective tone has been in some way associated. This impulse arises within the conscious disposition to deal with the situation in and for itself. We must remember that perceptual process, as such, is limited to the immediate situation and the meaning it has acquired. It has *as such* nothing to do with the worth of the behaviour for more remote ends.

But when, through much comparison of varied kinds of behaviour, an ideal construction of conduct directed to some purpose takes form in the mind, there are, in addition to the promptings of primary impulse to get pleasure out of the situation, motives involving the consideration of the bearings of the act on some more remote end. Their affective tone is a desire to attain that end; and the satisfaction of such a desire must outweigh the pleasures or pains attaching to the situation in and for itself. If, when one of our pupils has cut himself severely, we have to bind up a serious and gaping

wound, the sight of blood and the cruel gash may fill us with impulsive aversion to the task which we none the less perform, of our own free will, from no external compulsion, and in spite of the fact that all our affective feelings, arising out of the immediate situation, are acting as deterrents. We probably have to cause the child some pain, but we do so for the child's future good, looking forward beyond the present situation. This is only a particular case by means of which to exemplify an extensive class of human acts in which we disregard the impulses of the moment; in which conduct leads us not along the ways of immediate and direct pleasure and ease, but through scenes fraught with many forms of discomfort, annoyance, sorrow, and sometimes patient suffering. In them we have passed beyond the perceptual stage of development, in which each situation is dealt with frankly in and for itself, and have reached the level of ideational process, of volitional acts, of rational and moral procedure, of conduct which betokens character. When a man, in spite of his aversion to an unpleasant task, tends an injured companion, we cannot explain his conduct without going beyond the immediate situation. We say that he is actuated by motives of humanity. A particular situation, the like of which may never have occurred before, is only the opportunity for the alleviation of suffering; only the occasion for putting in practice what has already been conceived as the fitting act the kind of man he desires to be would do under such circumstances.

The essential feature of motive is that it is in relation to some purpose within a scheme of ideal construction. The primary impulses are characterised by appetite or aversion, tendencies towards the development of some situation or tendencies fromwards, as Hobbes phrased it.

Motives, too, are towards or fromwards. But there is an object of desire to which the development of the situation is only contributory. From a slightly different point of view the primary impulses lead to the realisation of the perceptual self, while motives lead to the realisation of the ideal self. Within that ideal construction are a number of objects of desire, each of which is named by an abstract term—some personal, such as ambition and self-improvement; some having regard to others, such as humanity and pity; some having more general reference to the social concept, such as justice and honesty. The term "motive" requires as its completion one of these terms; we speak, for example, of motives of pity or of justice; or it requires an adjective of like conceptual implication, such as religious, prudential, political. Since, however, the ideal construction of social conduct is very complex and the objects of desire varied, there often arises a diversity of motives appealing to different aspects of the ideal self. Political expediency may suggest a line of conduct which may appear to involve some injustice. Motives of self-regard may conflict with those having regard to the good of others.

A lack of consonance in motives, in presence of more impulsive tendencies, is familiar in the affairs of daily life. The desire to keep my body and brain in good working order may conflict with my desire to finish this chapter. Hygienic motives suggest a round of golf; motives of industry, and perhaps the lust of finishing, suggest sitting on at my writing-table. If I go out I shall probably work better and more rapidly on my return; but I may find other business awaiting me, and then I shall grumble at not having made any progress. The weighing of the *pros* and *cons* in such a case is *deliberation*. The result will probably depend upon which aspect of the

ideal self is uppermost—the self invigorated by exercise (with a pleasurable impulse thrown in) or the industrious self, just a little flat and stale. And generally some fresh consideration is suggested which makes one or other preponderate. If I happen to remember that it is a match day on the golf course, which will therefore be crowded, that may decide the matter; or if I remember that a friend asked me to call in, if I could get away, as he wanted, if he too could get away, to play with me, that may decide the matter. It would be selfish not to give him a game. When one aspect of the self already tends to preponderate we can often find an additional motive which may serve as an excuse to the other aspect and clench the decision. Suppose, then, that I start off, and having reached my friend's house, am met with an apology; he is really very sorry; he had fully expected to be able to get away, but he has some literary work to finish, and he makes it a rule not to let golf come before the performance of duty. Of course I agree with him, though I may feel that my agreement is not quite in accord with my own action. Still, having started, I am not to be balked of my game; that would show weakness and indecision. I will try and induce another friend to come out with me. But then, in some degree, and more insistently afterwards when I review the matter before my unfinished tale of work, the other aspect of myself comes uppermost and whispers: This unselfishness, then, was a palpable excuse; you really wanted to play, and did not care whether you neglected your work or not, so long as you did what was most pleasant. This silent admonition of the other aspect of the self is of the same order as what we call the voice of conscience.

Although it may be present in the midst of action as a numb feeling of dissatisfaction rather implicit than

explicit, it is generally in subsequent moments of retrospection, when under different circumstances we reflect over our conduct, that the self-dissatisfaction of conscience passes into a definite judgment of self-disapprobation. The relative strength of impulses and motives is not what it was in the midst of action. Then a number of situational elements were pressing in their insistence, the claims of ideal conduct were in abeyance. Now the position is different. In our more rational moments of reflection it is the ideal construction of social and ethical conduct that is in the foreground of attention; the situational and impulsive factors before so insistent are now subordinate. Hence the now-self is different from the then-self, which is viewed with disapprobation, with regret for its minor errors, perhaps with remorse for its graver sins against the moral ideal. In our moments of reflection, too, the social aspect of the self is predominant. W. K. Clifford therefore spoke of conscience as self-judgment in the name of the community. All approbation and disapprobation, both of our own acts and those of others, have this implicit social support. And this we have seen to be the case with all social judgments.

We must remember that correlative with the ideal self is the ideal community. They are indeed co-ordinate factors within a single ideal construction. The community includes the self, and the self is a constituent part of the community. What we call the *rights* of the members of the community are just what we conceive they ought to have, and therefore may claim from others, in accordance with the ideal construction. What we call *obligations* are what we conceive they, in return, owe to the community, again within the ideal construction. *Duties* grow out of the reciprocal interaction of rights and obligations. *Justice* is the even balance between

them. *Moral responsibility* is accepted by each individual for himself and others in the name of the social self—that is to say, the self within the ideal construction implying the relationship of self to the community. It is thus in connection with the social maximum as ideally conceived, not the social minimum enforced by statutory penalties. Legal responsibility is imposed by the civil law of the realm, irrespective of individual acceptance.

The school is a miniature community, of which the constituent members are the junior and senior boys or girls, and the hierarchy of masters or mistresses. As the boy passes up the school he should gain clear conceptions of what this community should be and what part he has to play within it. Rights and obligations within the school life, duties arising out of these, the due balance of justice, take form in a practical field of intercourse demanding many forms of conduct. Under rules of discipline what answers to legal responsibility is enforced; but in many subtle ways the teacher will minister to the growth of a sense of moral responsibility more exacting but self-imposed. Although, of course, it does not constitute for the boy his whole field of intercourse—for the home and its social surroundings are often of at least equal importance—still the school does in large degree represent for a while the State. Nothing is of more vital moment in a great school than the social standard of “good form” that is developed therein. It is scarcely too much to say that the schoolboy’s conduct is more strongly influenced by a desire to conform to the school standard of usage and current opinion than by any other motive. For one who throws himself heartily into the school-life, the stigma of “bad form” is something to be avoided at all hazards. And though the standard of “form” may alter as we go through life, yet the desire to

conform to social usage, and so to act as to win social approbation and to escape social disapprobation, is, it would seem, the predominant motive, with the majority of us so long as it does not directly conflict with prudential self-interest. Happy the school, therefore, and happy the community which possesses a high standard of social usage and custom; which, possesses, in a word, a high social ideal of what the community should be and should do.

In the study of history splendid opportunities are afforded to the teacher of giving an indirect impetus to the development in the pupil's mind both of the ideal self and of the ideal community. For history presents us with concrete examples of strenuous endeavour towards the realisation both of individual character and of a better social condition of the community at large. However open it may be to criticism from the point of view of the scientific historian, there can be no question that hero-worship is of great importance in the development of the character of the worshipper. Hence it has been said: Tell me a man's heroes, and I will read you his character. I have before said that one of the main points of value in history as a school subject, and even as a subject for our bigger schoolboys at the university, is that it widens the sympathies by extending representatively the field of intercourse. I would now add, that while it widens the sympathies it also affords concrete examples of conduct and picturesque material for an insensible and unobtrusive training in approbation and disapprobation. It also affords us the material for drawing the distinction, with reference to concrete examples, between merit and virtue. There are some types of character so happily constituted that we may say of them that there is no merit in their virtue. For merit is proportional to the

struggle. And there's many a schoolboy in whom self-mastery is not yet established, whose half-won goodness, under difficult circumstances, is more meritorious than the easy self-denial of one of maturer years.

Literature, too, as well as history, affords concrete examples of conduct which should be utilised by the teacher in the same unobtrusive and insensible fashion, not moralising and preaching from the literary text, but stimulating, by his own enthusiasm for certain excellencies of character, a like enthusiasm in the minds of his pupils. In many cases the literary artist has had in view this wholesome influence on his readers in the creation of his characters. It is part of his aim to subtly indicate through the portrayal of character what is his own ideal self and what his ideal community. And it is one of the functions of the artist to lead us to see, through the delicate emphasis which characterises his synthesis, features which would otherwise have escaped our duller vision. As Browning says in his *Fra Lippo Lippi*:

“For, don't you mark? we're made so that we love
First when we see them painted, things we have passed
Perhaps a hundred times nor cared to see;
And so they are better, painted—better to us,
Which is the same thing. Art was given for that:
God uses us to help each other so,
Lending our minds out.”

What we have to do as teachers is to “lend our minds out” to the best possible purpose. For we too are artists; and the materials with which we have to deal are human minds and their environment.

We must now return to the distinction above drawn between the primary impulses which are the outcome of perceptual development and the motives which arise when an ideal construction of self and community has taken

form in the mind. When this stage is reached ethical judgment is passed, in terms of approbation, rather on the motive for conduct than on the actual behaviour. An important part is, however, played by habit. We have seen that volitional conduct, that due to the exercise of the will, implies motives and often involves deliberation. A course of action is chosen because it will subserve a purpose and enable one to reach an end—that of developing some aspect of the self. But if such a course is persisted in and repeated on similar grounds on many occasions, an ideational disposition so to act becomes better and better organised; deliberation is no longer necessary, effort ceases, volition lapses. Self-control has done its work. Tendencies so to act under such circumstances have been firmly established. We do the right or expedient thing almost automatically. There is no longer any need, as there was at the outset of volitional conduct, to look beyond the immediate situation and to weigh the consequences. That was part of our earlier education in conduct, and now education has done its work. Facilitation has rendered appropriate activities spontaneous, and habit has begotten *secondary impulses* which take the place of the motives which are no longer necessary just because they have played their part in the organisation of well-established conduct. The course of progress therefore is: first, the development of primary impulses of perceptual origin relatively isolated and attaching to the dispositions arising in connection with situations of frequent occurrence; later, the development of motives in relation to wider purposes, implying an increasing unity and continuity of conduct in view of an end to which diverse situations are contributory, and involving the conception of an ideal self which is the object of desire; and then, through habit and facilitation, and by the

lapsing of motive, the establishment of secondary impulses prompting to the spontaneous performance of conduct appropriate to the circumstances, without need of consideration or deliberation.

The influence of the law of habit, through which volitional conduct becomes spontaneous and motives insensibly pass into secondary impulses, can scarcely be over-estimated. It lies at the very root of all training of character. Of all people in the world, teachers should remember that in every act of our lives, no matter how trivial, we are laying the foundation of all our future conduct. Looking forward to the men and women his pupils are to become, he should bear in mind what Miss Edith Simcox wrote many years ago. "Does it seem," she asks, "a trifling thing to say that in hours of passionate trial or temptation a man can have no better help than his own past? Every generous feeling that has not been crushed, every wholesome impulse that has been followed, every just perception, every habit of unselfish action, will be present in the background to guide and to restrain. It is too late when the storm has burst to provide our craft with rigging fit to weather it; but we may find a purpose for the years which oppress us by their dull calm, if we elect to spend them in laying up stores of strength and wisdom and emotional prejudices of a goodly human kind, whereby, if need arises, we may be able to resist hereafter the gusts of passion that might else bear us out of the straightforward chosen course."

But the influence of habit in the moulding of life is characteristic of the whole of mental development in knowledge, in æsthetic appreciation, and, as we must now clearly grasp, in conduct. The growth of knowledge, for example, is dependent, as we have seen, on ideational process, through which the data of experience after analysis

and comparison are brought into relationship and synthetically organised. It is only at the growing edge, however, that organisation is in progress; it is here that synthesis occurs; it is here that ideational process is actually at work; it is here that intellectual dispositions are in course of formation; it is here that assimilation and incorporation take place. But behind the growing edge is the knowledge that has been already organised; there synthesis has occurred; there ideational process has done its work; there intellectual dispositions have been formed; there assimilation and incorporation have taken place. The knowledge already won forms the intellectual platform on which we stand while we reach forth in order that we may win the more. We should never make any progress if we had constantly to be rethinking our old thoughts, learning afresh what we had previously learnt, going over again all the processes of judgment, drawing anew every conclusion to which we have been led. That is unnecessary. We utilise again and again the results which have become so familiar that they come to mind spontaneously and without effort. A continuously growing edge of systematic knowledge is only possible if what was gained in previous growth has passed into established habits of thought, leaving ideational process free to carry further the work of ideal construction.

So is it also with conduct. The growth of conduct is dependent upon volitional process, through which our life activities are brought into relational harmony and organised. It is only at the growing edge, however, that organisation of conduct is in progress; it is here that volitional process is actually at work; it is here that moral and other dispositions to act in appropriate ways are in course of formation. But behind the growing

edge is the conduct that has been organised; there volitional process has already done its work; there moral and other dispositions to act in appropriate ways have been formed. The conduct already established forms the conative platform on which we stand while we reach forth towards the further bettering of conduct. We utilise again and again the activities which have become so familiar that they have passed into the region of spontaneous performance. A continually growing edge of systematic conduct is only possible if what was gained in previous growth has passed into settled habits of action, leaving volitional process free to carry farther the work of organising our activities in accordance with the purposes of social life.

One result of the organisation of ideational dispositions is that the process of judgment passes into an implicit stage and takes place spontaneously. The grounds of judgment cannot at once be rendered explicit. Such are the judgments which we attribute to "common sense"; such are those which we often speak of as *intuitive*. They are ideational in their character, but are the outcome rather of what *has been* ideationally organised than of what *is being* so established. Hence they seem inexplicable, almost mysterious—their characteristic feature is their immediacy. They come, but how they come, and upon what experience they are based, we cannot say. In this they resemble our perceptions. They, too, are immediate. Only by careful psychological analysis can the basis in experience of the intuitions of sense-perception be disclosed. The result of that analysis reveals a paradox. The perception seems to be independent of all previous experience, just because that experience is so full and rich and so completely organised. Well behind the growing edge it has passed into a settled and spon-

taneous habit of perceiving. So it is also with the intuitions of apperception—the ideational or intellectual intuitions. They, too, seem to be independent of all previous thought-experience, just because it has already been organised. Well behind the growing edge the data are subconsciously dealt with, and issue as intuitive judgments, which it is then the function of logic to analyse and justify: logic is thus the after-thought of intuitive insight. In the field of conduct there are likewise intuitive judgments of approbation and disapprobation. They are really the outcome of all our moral training superimposed on all that has been established through perceptual process. They issue spontaneously from what has been engrained in the character and rendered subconscious through habit. Such intuitive, unanalysed judgments are whispered by the voice of conscience; it is the function of ethics to render explicit their nature, their mode of genesis, and their worth, within an ideal construction of conduct as moral.

It is almost impossible to consider conduct and character in their relation to the will without touching, however briefly, on some philosophical questions which are inevitably suggested. We may lead up to them through a few words of resumé and some definition of terms. Activities that are the outcome of perceptual process constitute behaviour, which is thus the generic term which includes all such activities; the psychological antecedents and concomitants of perceptual behaviour, in their conative aspect, are the primary impulses. Conduct is social behaviour which is, or has been, rendered systematic by volitional process. What do we understand by the term “volitional process”? To this question we can only answer that it is applied to ideational process *in its conative aspect*. For it “the exercise

of the will" is, for psychological treatment, an equivalent expression. If we ask what is the will? we can only reply that it is what is implied in all volitional process! The antecedents and concomitants of volitional conduct, in their conative aspect, are motives. Motives are present when the organisation of conduct is in progress; but when habits of action have been established motives are no longer explicit as such, and have passed into secondary impulses. Conduct then becomes spontaneous. Of character it is not easy to give a satisfactory definition. We know that each child, and every man or woman, has, partly through heredity, partly as the result of perceptual or ideational acquisition (including the effects of education), certain tendencies to act in this way or in that. The term "tendencies" is itself no doubt somewhat ambiguous; but it is difficult to find another which is less so. It summarises all that we mean by saying that under given psychological conditions certain psychological activities, having appropriate expression in behaviour or conduct, do as a rule occur, and therefore may be expected. The net result of all these tendencies, thus understood, which serve to differentiate the child or adult from other children or men and women, is the character of that individual. It is a complex whole peculiarly difficult of analysis. The most we can do is to select salient points for emphasis. But the outcome of this complex net result of inherited and acquired tendencies is perceptual behaviour or ideational conduct. The training of character is therefore the establishment of tendencies to that kind of conduct which we view with approbation. Here, again, we have a standard or ideal to the realisation of which our efforts are directed.

But surely—it will be said—character is something more than a group of tendencies; surely the will is not

merely a name for a particular kind of mental process. Is not character the spiritual reality of which conduct is the expression? Is not the will that which is the underlying cause of volitional process? These questions open up large problems. It will be remembered that in the first chapter we had occasion to ask: What is the mind? No answer was then given save that the term "mind" stands for a very general and abstract conception. I then said: "Whatever the mind may be as an actually existent reality, comprising all our experience, all our knowledge, all our hopes and fears, all the impulses and motives which spur us to active endeavour, it is wider, fuller, richer than any given field of consciousness." Now, to such questions as: What is the mind? What is the character? What is the will? What is the self or ego? different answers are given in accordance with the universe of discourse within which they are asked. The universe of discourse in psychology is that of natural science. As a branch of natural science it accepts the facts of experience, knowledge, and conduct; classifies them; tries to show their connections; endeavours to ascertain the laws or general rules of their sequence. It strives to elucidate and interpret the processes which are taking place. "Mind" is the generic term under which it classifies the whole series of psychological products and processes; "will" is that under which it groups the ideational processes in their conative aspect; "character" is that under which it places the established tendencies to specialised forms of activity; the "self" or "ego" is the generic term under which it classifies the whole field of subjective reference. It uses the term "faculties"—instinctive, intelligent, rational, æsthetic, moral, and so forth—as group names, and with no further implication. But there is another universe of discourse—that of

metaphysical philosophy—within which these answers given by psychology are regarded as inadequate. Within that universe replies are given, or at least sought, to deeper questions. What is the mind which produces what the psychologist merely classifies; which unites and combines in serial order, and thus determines the sequence of states of consciousness; which is, in a word, the reality of which mental phenomena are the products? What is the will, not only as the set of conditions under which guidance takes place, but as that which really guides and controls? And in what sense is the will free? What is the character of which observable tendencies are only the signs by which its presence is indicated? What is the self as an abiding reality to which subjective reference is made? To these questions no answer can here be given or attempted. They lie beyond the confines of psychology. The teacher is almost certain to ask them. He will probably find somewhat crude answers ready to hand. For the discussion of these difficult problems, however, he must turn to works on philosophy. But it should be remembered that a psychologist who passes them by unanswered does not necessarily deny their importance. Nay, more, he is bound to recognise their existence as products of ideational process, though he is nowise bound to discuss the validity of the solutions which the philosopher may offer.



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